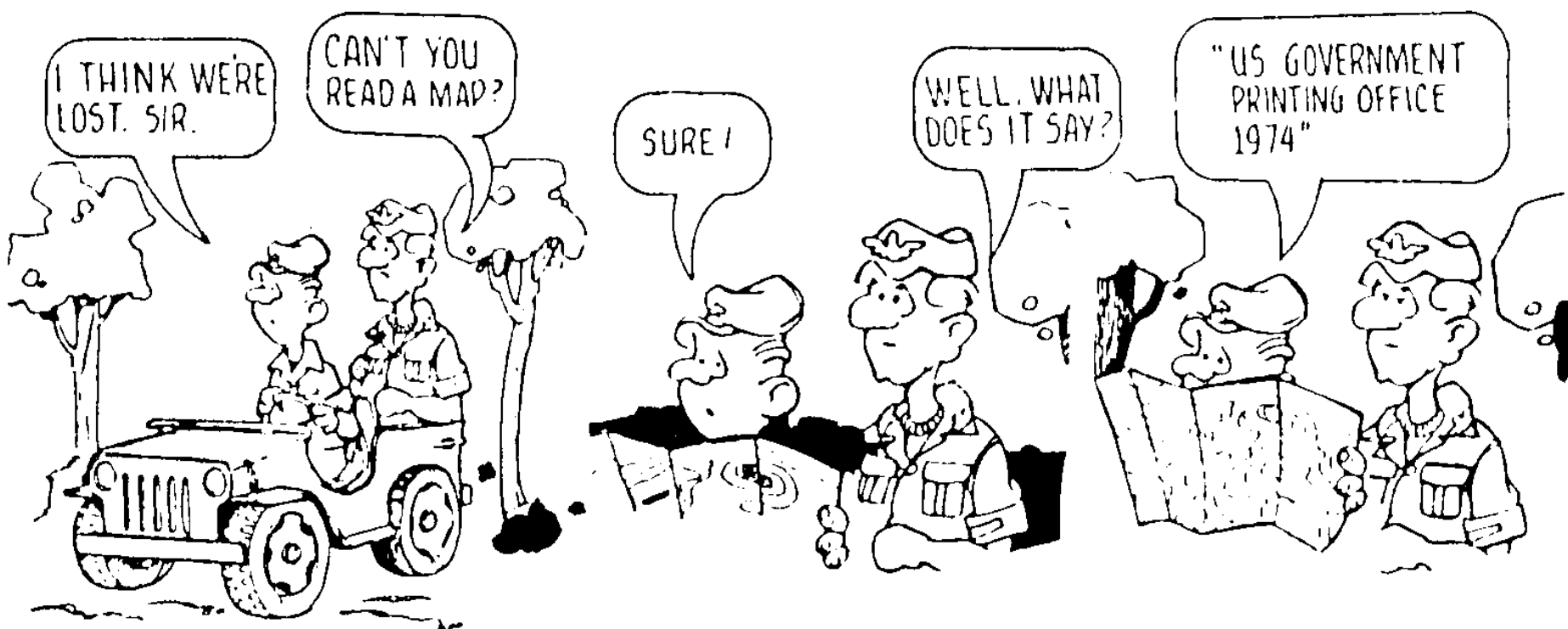




# MAP READING



**SSTC**



All Army noncommissioned officers, as leaders, must be able to navigate from one point to another. The ability to find your way from one location to another on the ground by using a map and or a compass is necessary for conducting successful military operations. If you get lost in combat, you may run into the enemy and fail your mission. To keep from getting lost, you must be able to read a map and use a compass correctly while planning tactical movements, **SSTC** developing unit sustainment, and



# **ENABLING LEARNING OBJECTIVE**

**Given a military map, classify it by type and scale**

**Identify the marginal information**

**Identify the six basic colors**

**Locate an object on a military map using the military grid reference system within 10 meters**

**Given a military map, calculate the height, above sea level, of a specific point**

**Given a military map, using straight line and/or road distance methods, determine the distance from one point to another**

**SSTC**



# WHAT IS A MAP?

A MAP IS A GEOGRAPHIC PRESENTATION OF A PORTION OF THE EARTH'S SURFACE DRAWN TO SCALE, AS SEEN FROM ABOVE. IT'S USES COLORS, SYMBOLS AND LABELS TO REPRESENT FEATURES FOUND ON THE GROUND.

**SSTC**



# **PURPOSE OF A MAP**

A MAP PROVIDES INFORMATION ON THE EXISTENCE OF THE LOCATION OF, AND THE DISTANCES BETWEEN GROUND FEATURES, SUCH AS POPULATED PLACES AND ROUTES OF TRAVEL AND COMMUNICATION. THE MAP ALSO INDICATES VARIATIONS IN TERRAIN HEIGHTS OF NATURAL FEATURES, AND THE EXTENT OF VEGETATION COVER.

**SSTC**



# MAP SECURITY

- » SPECIAL HANDLING (DOCUMENTS)
- » INFORMATION OF MILITARY OPERATIONS
- » MAP DESTRUCTION (METHODS)
- » THIRD PARTY LIMITATIONS

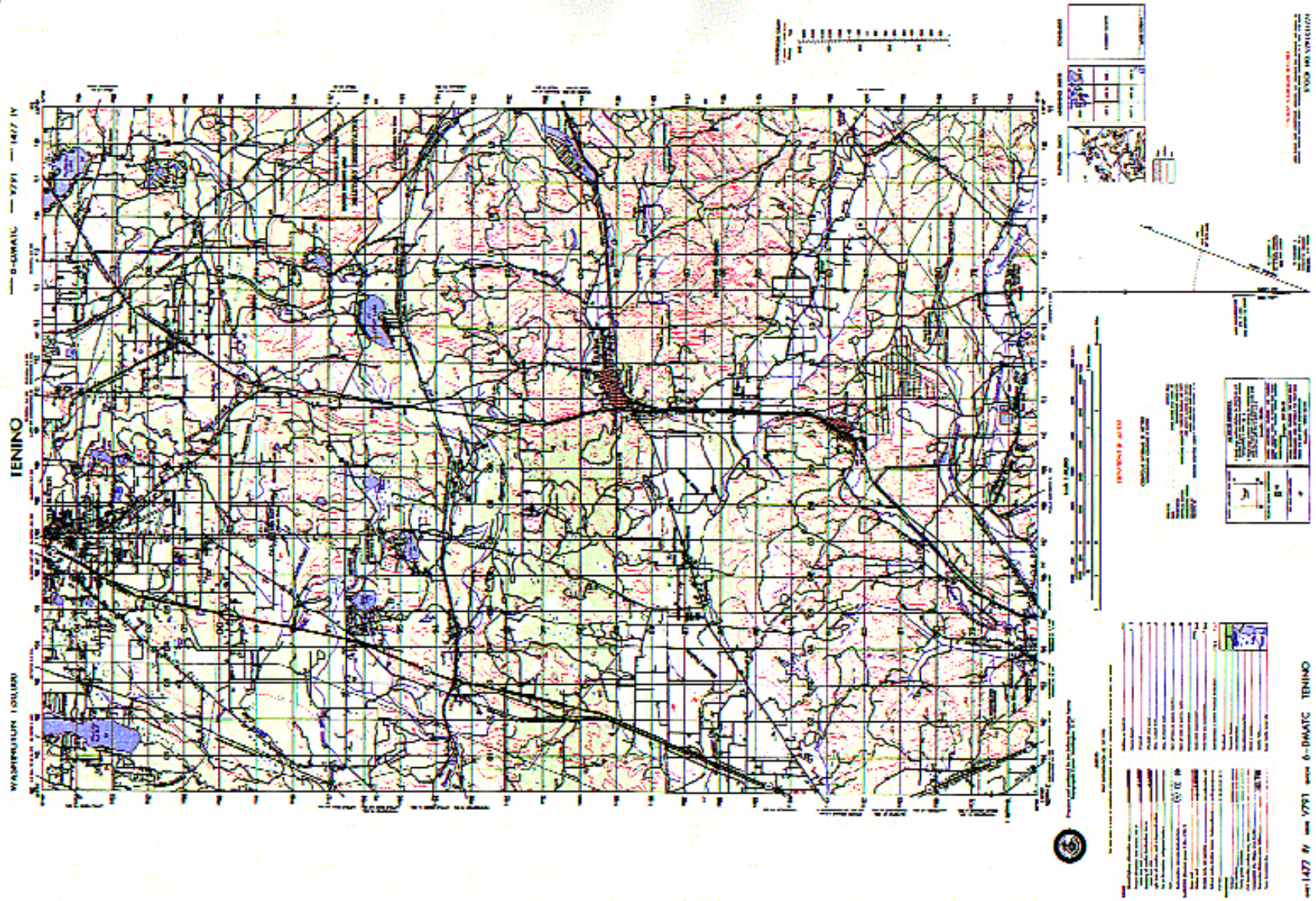
**SSTC**



# MAP CARE

- ✕ PROTECTION FROM ELEMENTS
- ✕ TRANSPORTING
- ✕ CARE FOR LONGEVITY
- ✕ PENCIL VERSUS PEN

**SSTC**





# MARGINAL INFORMATION

Information and instructions placed along the border of the map are

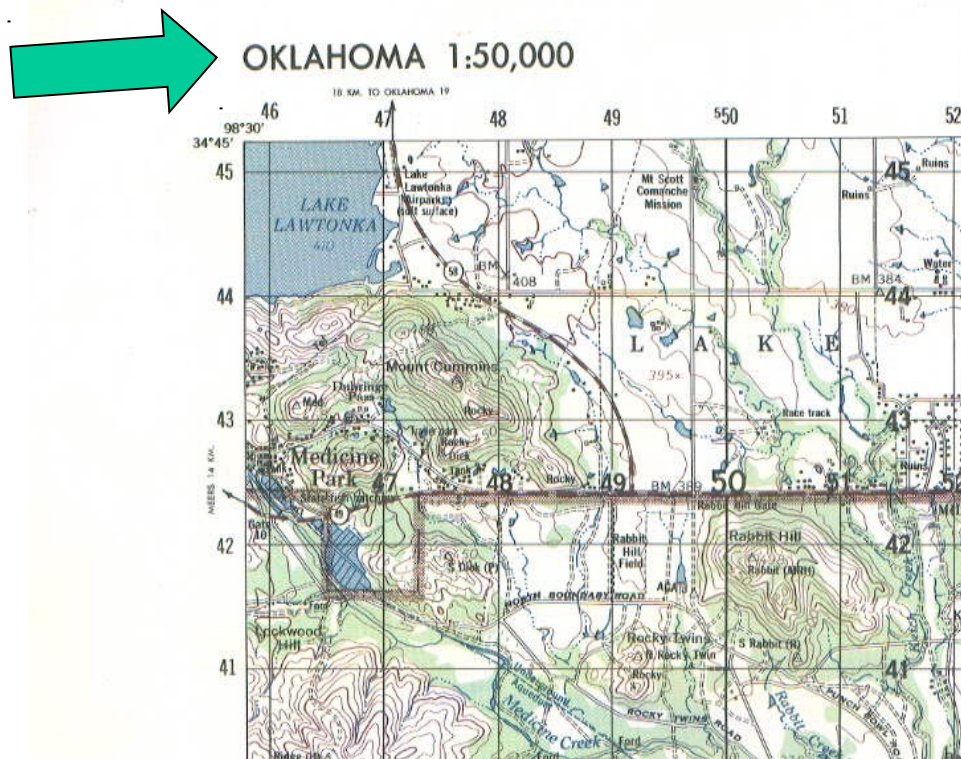
called marginal information. The marginal information contains:

- **Sheet Name**
- **Scale**
- **Sheet Number**
- **Bar Scales**
- **Series Number**
- **Declination Diagram**
- **Edition Number**
- **Grid Reference Box**
- **Contour Interval**
- **Adjoining Sheets**
- **G-M angle**
- **Diagram**
- **Legend**
- **Elevation Guide**
- **Index to Boundaries**

SSIC



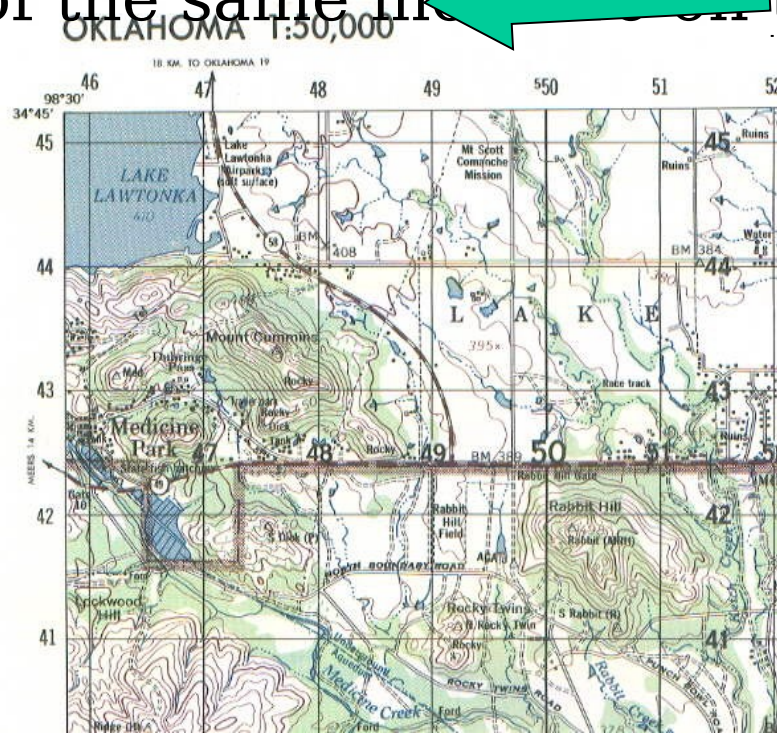
**Series Name** - The name given to the series is generally that of a major political subdivision, such as a state within the United States or a European nation. A map series usually includes a group of sheets or maps at the same scale and on the same sheet lines or format designed to cover a particular geographic area



**SSTC**



**Scale** - is a representative fraction that gives the ratio of a map distance to the corresponding distance on the earth's surface. For example, the scale note 1:50,000 indicates that one unit of measure on the map equals 50,000 units of the same measure on the ground.



**SSTC**



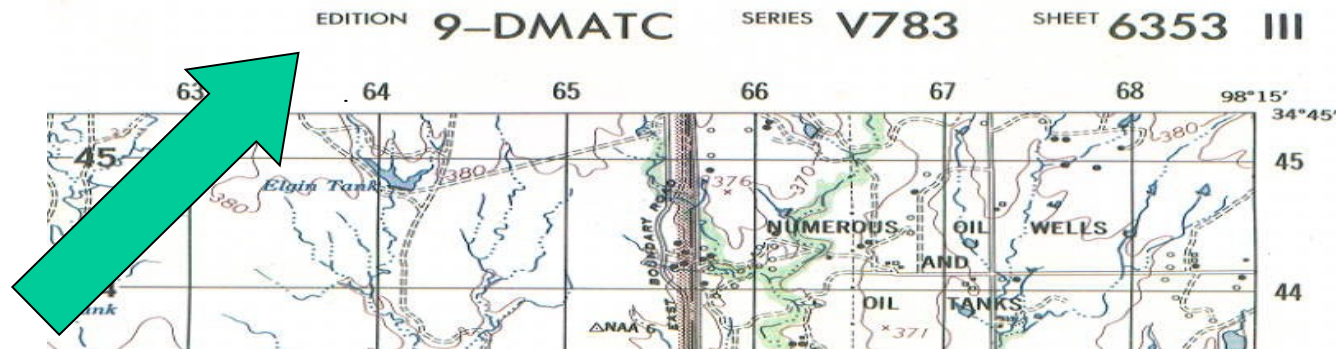
**Sheet Name** - The sheet name is found in bold print at the center of the top and in the lower left area of the map margin. A map is generally named for the largest settlement contained within the area covered by the sheet, or for the largest natural feature located entirely within the area at the time the map was drawn.



**SSTC**



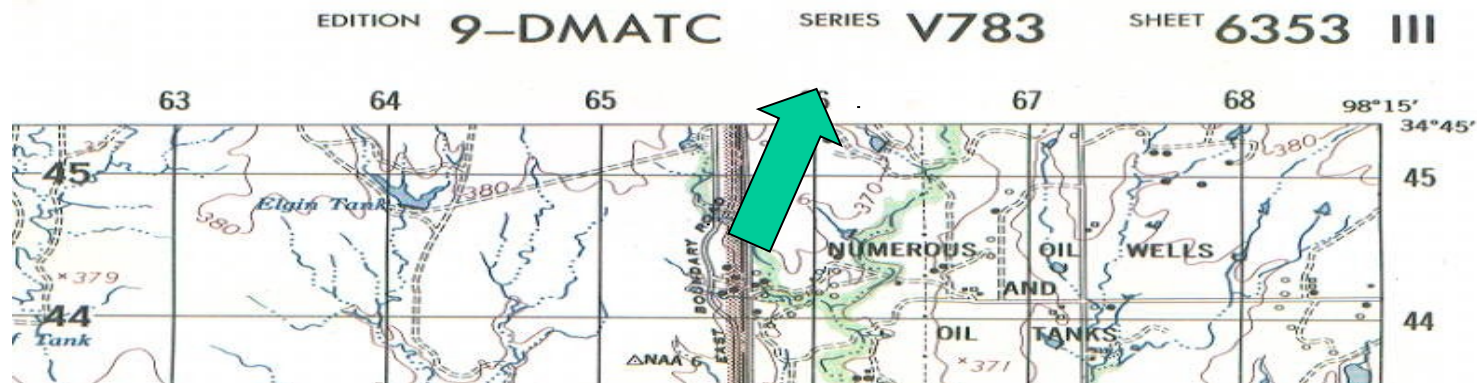
**Edition Number-** are numbered consecutively; the highest number sheet is the most recent. The map information date is found immediately below the word "LEGEND" in the lower left margin of the map. This date is important when determining how accurately the map data may be expected to match what you will encounter on the ground.



**SSTC**



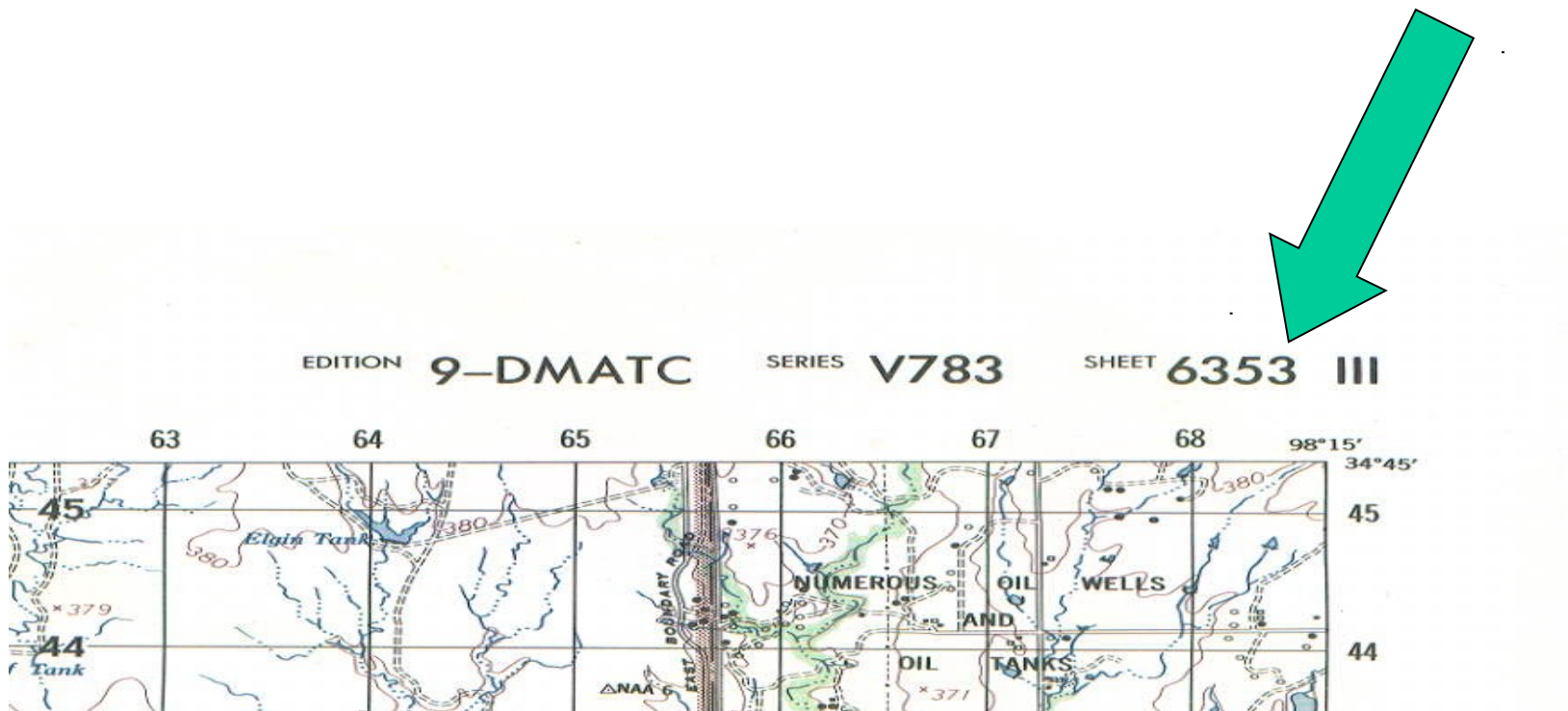
**Series Number** - It is a sequence reference expressed either as a four digit numeral (1125) or as a letter, followed by a three or fourdigit numeral (M661; T7110).



**SSTC**



**Sheet Number** - It is used as a reference number to link specific maps to overlays, operations orders, and plans.

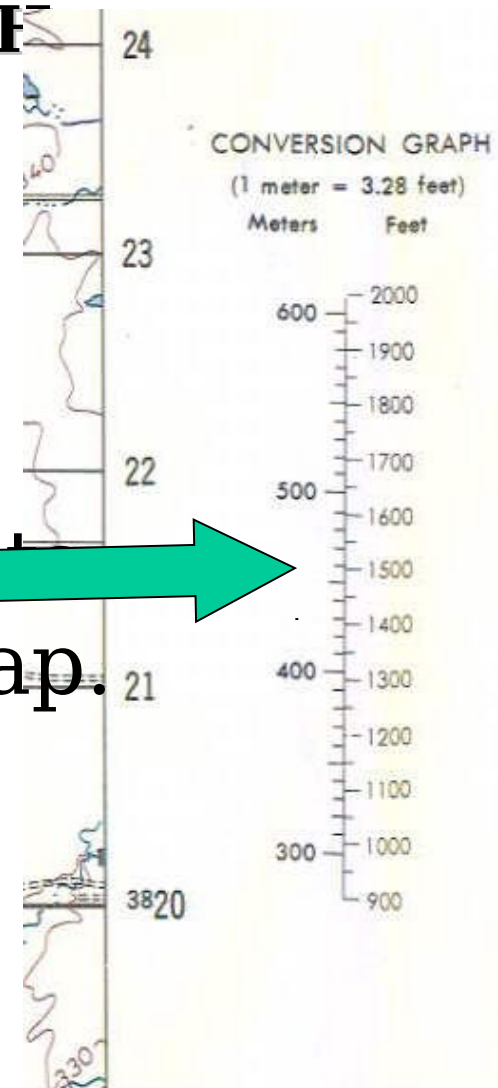


**SSTC**



## CONVERSION GRAPH

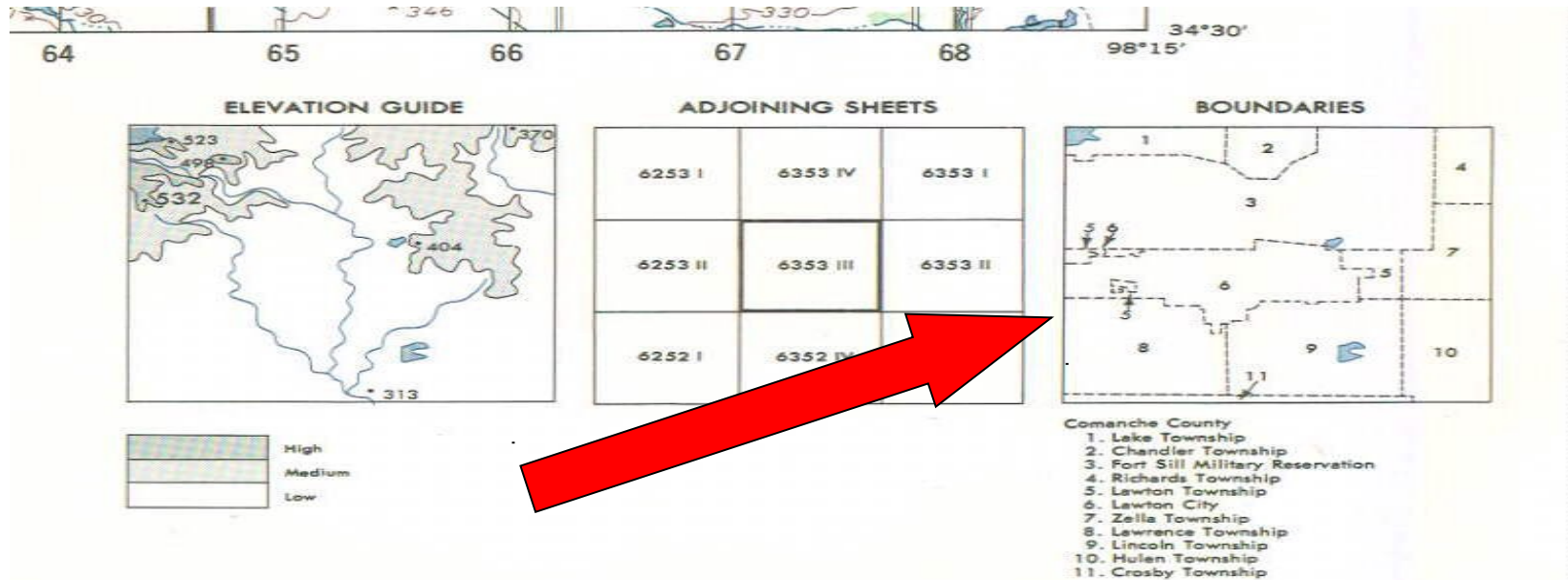
This graph indicates the conversion of different units of measure used on the map.



**SSTC**



# ELEVATION GUIDE, ADJOINING SHEETS, ET

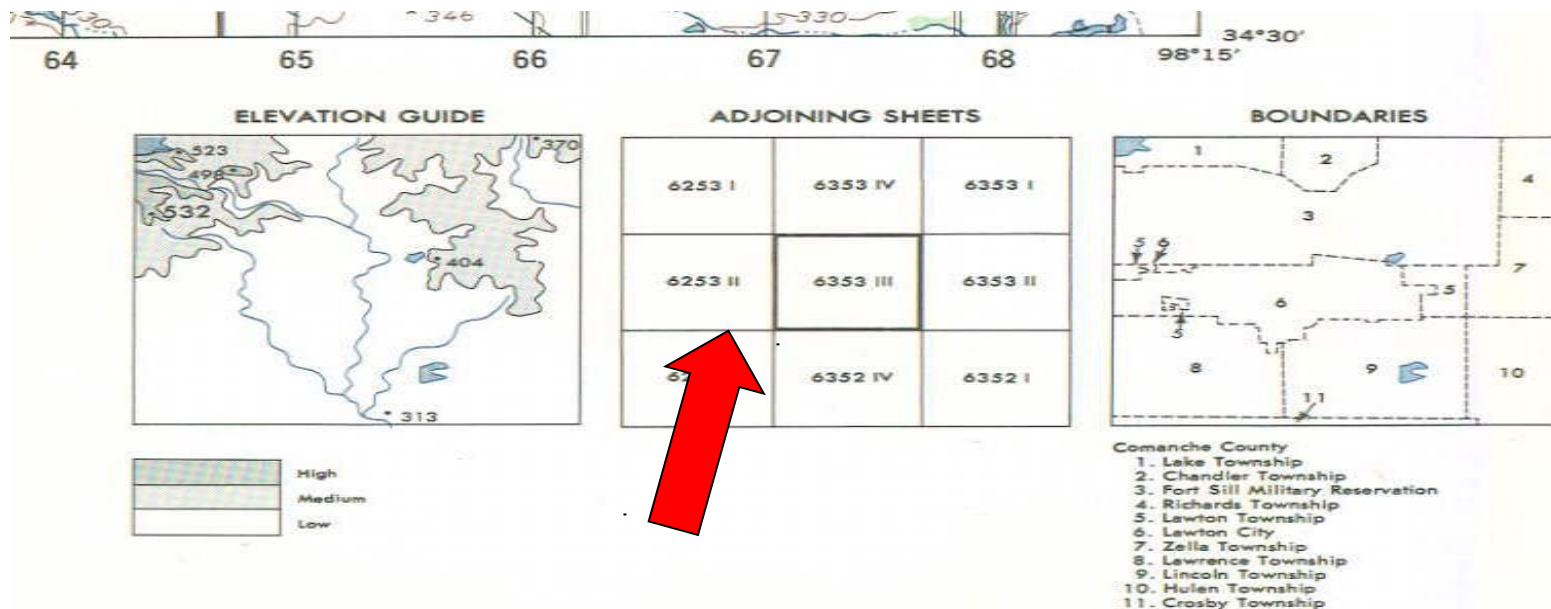


**Index to Boundaries** - This diagram, which is a miniaturized version of the map, shows the boundaries that occur within the map, such as county lines and state boundaries.

**SSTC**



# ELEVATION GUIDE, ADJOINING SHEETS, ET

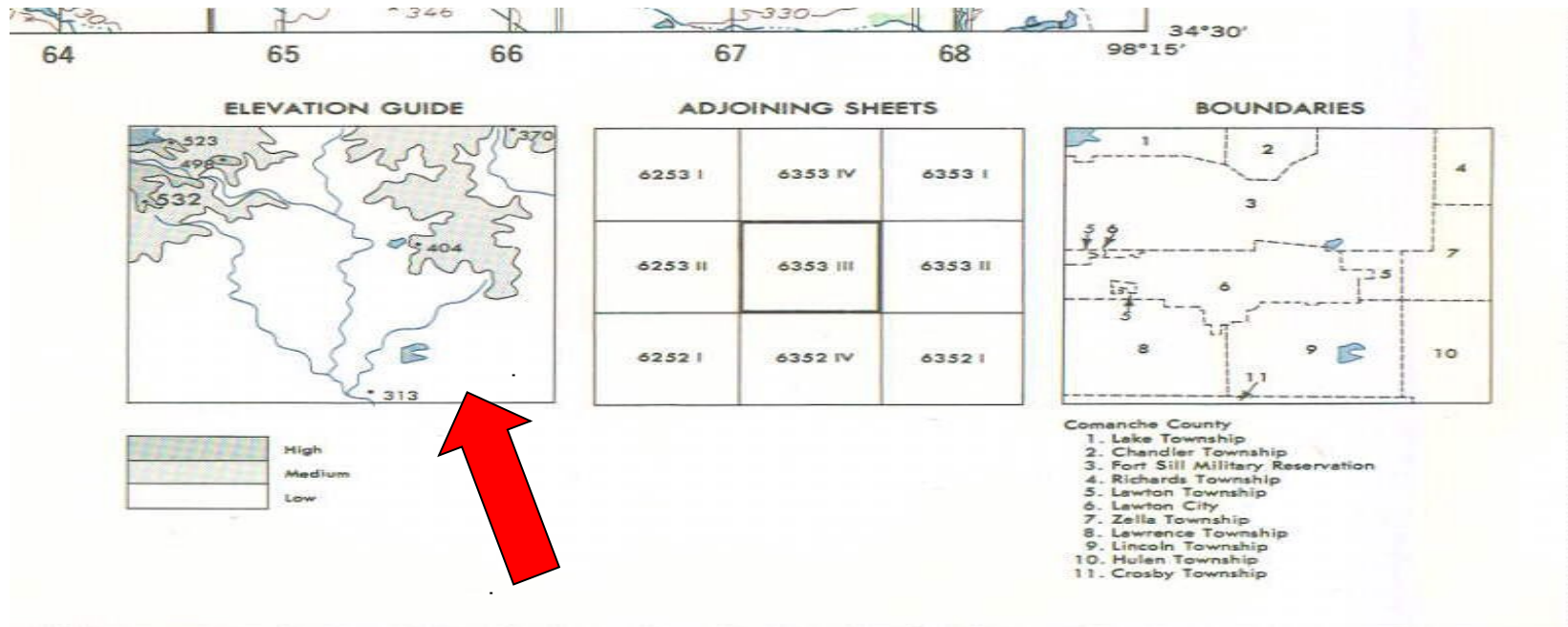


**Adjoining Sheets Diagram** - is called the index to adjoining sheets. It consists of as many rectangles representing adjoining sheets as are necessary to surround the rectangle that represents the sheet under consideration. The diagram usually contains nine rectangles, but the number may vary depending on the locations of the adjoining sheets. All represented sheets are identified by their sheet numbers. Sheets of an adjoining series, whether published or planned, that are at the same scale are represented by dashed lines. The series number of the adjoining series is indicated along the appropriate side of the division line between the series.

SSC



# ELEVATION GUIDE, ADJOINING SHEETS, ET



**Elevation Guide** - The terrain is represented by bands of elevation, spot elevations, and major drainage features. The elevation guide provides the map reader with a means of rapid recognition of major landforms.

**SSTC**



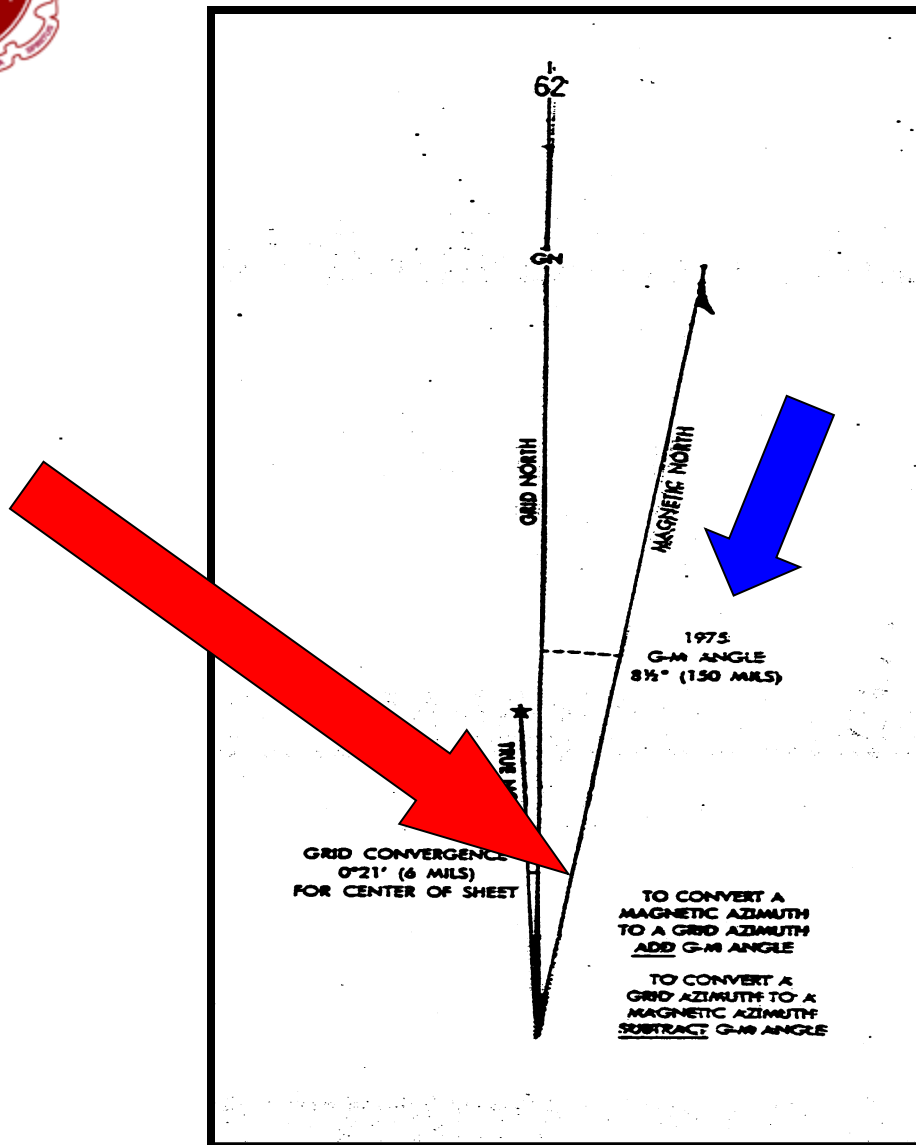
# DECLINATION DIAGRAM

- IS THE ANGULAR DIFFERENCE BETWEEN ANY TWO NORTHS.

- IT IS LOCATED IN THE LOWER MARGIN ON MOST LARGER MAPS

- ON MEDIUM SCALE MAPS, THE DECLINATION INFO IS SHOWN BY A NOTE IN THE MAP MARGIN

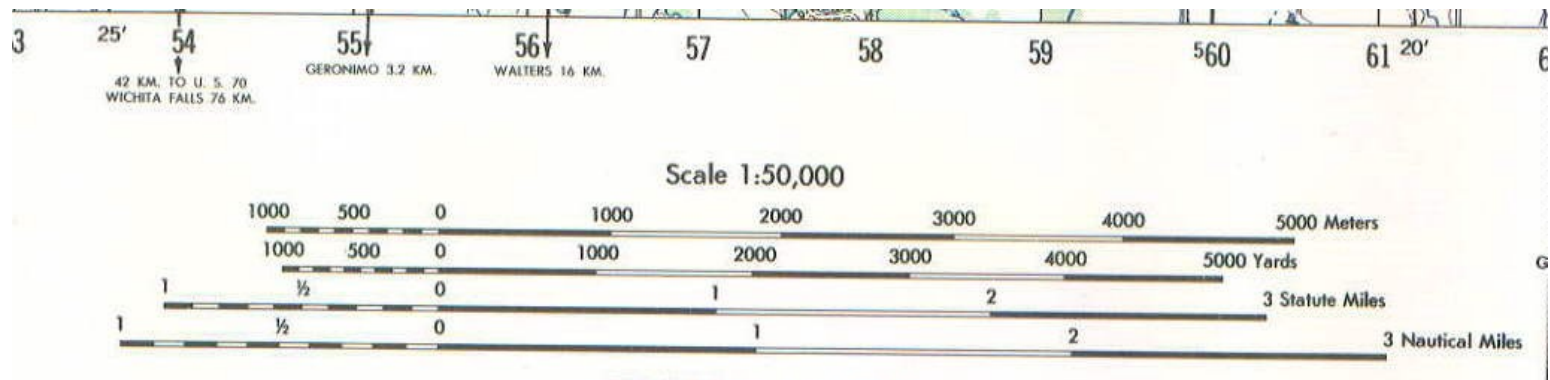
SSTC





# BAR SCALES

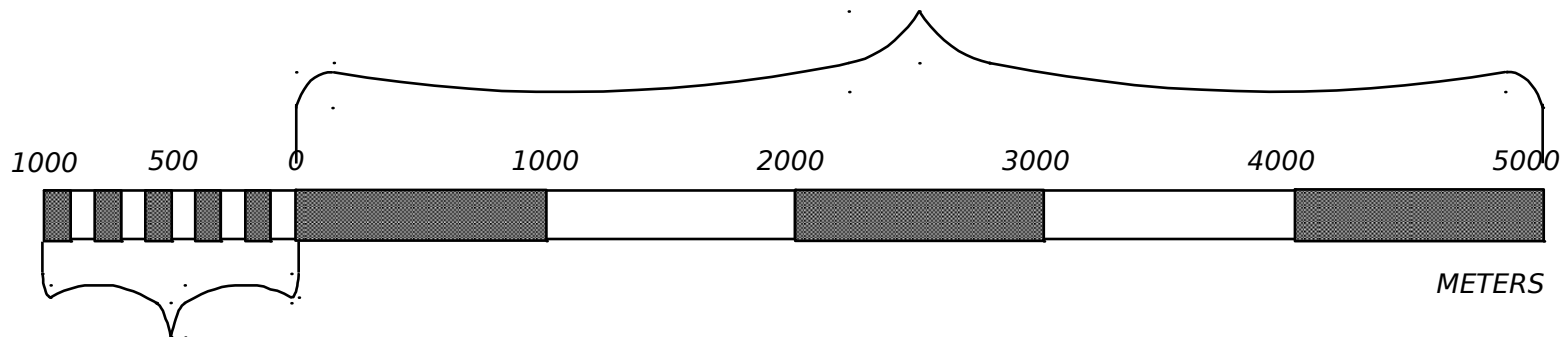
**A GRAPHIC BAR SCALE IS A RULER PRINTED ON THE MAP AND USED TO CONVERT DISTANCES ON THE MAP TO ACTUAL GROUND DISTANCE.**





# PRIMARY / EXTENSION SCALE

## PRIMARY SCALE



## EXTENSION SCALE

**SSTC**



# CONTOUR INTERVAL NOTE

**Contour Interval Note** - This note is found in the center of the margin normally below the bar scales. It states the vertical distance between adjacent contour lines of the map. When supplementary contours are used, the interval is indicated. In recent editions the contour interval is given in meters instead of feet.

**SSTC**



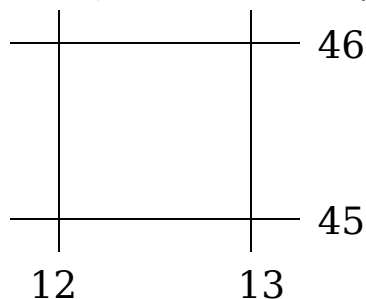
# ELEVATION IN METERS

## CONTOUR INTERVAL 10 METERS

### SUPPLEMENTARY CONTOURS 5 METERS

**SPIEROID.....CLARKE 1866**  
**GRID..... 1,000 METER, UTM ZONE 14**  
**PROJECTION.....TRANSVERSE MERCATOR**  
**VERTICAL DATUM.....NATIONAL GEODETIC, VERTICAL DATUM OF 1929**  
**HORIZONTAL DATUM.....1927 NORTH AMERICAN DATUM**  
**CONTROL BY.....NOS/NOAA, USGS, CE AND OKLAHOMA GEODETIC SURVEY**  
**PRINTED BY.....DEFENSE MAPPING AGENCY TOPOGRAPHIC CENTER 9-97**  
**FOR SALE BY U.S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225**  
**OR RESTON, VIRGINIA 22092**

SAMPLE 1,000 METER GRID SQUARE



100,000 M SQUARE IDENTIFICATION

NP

GRID ZONE DESIGNATION  
14S

#### 100 METER REFERENCE

1. Read large numbers labeling the VERTICAL grid line left of point and estimate tenths (100 meters) from grid line to point 12 3
2. Read large numbers labeling the HORIZONTAL grid line below point and estimate tenths (100 meters) from grid line to point. 45 6

Example: 123456

WHEN REPORTING ACROSS A 100,000 METER LINE, PREFIX THE 100,000 METER SQUARE IDENTIFICATION, IN WHICH THE POINT LIES

EXAMPLE: NP 123456

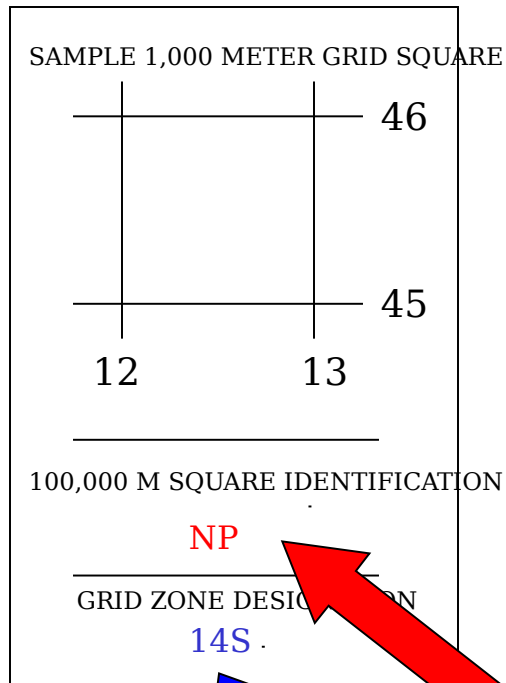
WHEN REPORT OUTSIDE THE GRID ZONE DESIGNATION AREA, PREFIX THE GRID ZONE DESIGNATION

EXAMPLE: 14SNP123456

**SSTC**



# Grid Reference Box - It contains instructions for composing a grid reference.



100 METER REFERENCE

1. Read large numbers labeling the VERTICAL grid line left of point and estimate tenths (100 meters) from grid line to point 12 3
2. Read large numbers labeling the HORIZONTAL grid line below point and estimate tenths (100 meters) from grid line to point. 45 6

---

Example: 123456

---

WHEN REPORTING ACROSS A 100,000 METER LINE, PREFIX THE 100,000 METER SQUARE IDENTIFICATION, IN WHICH THE POINT LIES

---

EXAMPLE: NP 123456

---

WHEN REPORT OUTSIDE THE GRID ZONE DESIGNATION AREA, PREFIX THE GRID ZONE DESIGNATION

---

EXAMPLE: 14SNP123456

**100,000 M SQUARE IDENTIFICATION**

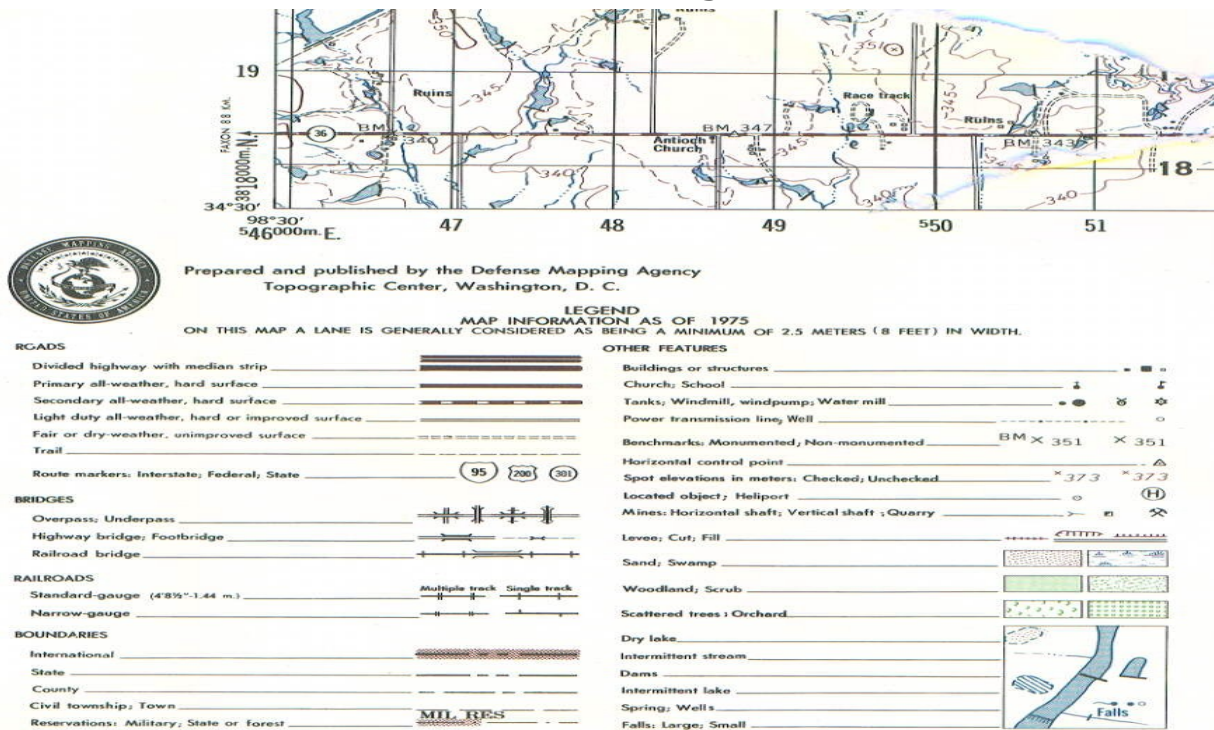
**GRID ZONE DESIGNATION**

**SSTC**



# THE LEGEND OF THE MAP

**Legend** - It illustrates and identifies the topographic symbols and depicts some of the more prominent features on the map. The symbols are not always the same on every map. Always refer to the legend to avoid errors when reading a map.





# COLORS OF THE MAP

**BLACK:** MAN-MADE FEATURES,  
SUCH AS  
BUILDINGS AND ROADS.

**REDDISH-BROWN:** RELIEF FEATURES AND  
ELEVATION

(CONTOUR LINES ON RED-LIGHT READABLE  
MAPS). **BLUE:** HYDROGRAPHY (WATER).

**GREEN:** VEGETATION (WOODS, ORCHARDS).

**BROWN:** RELIEF & ELEVATION (CONTOUR LINES ON OLDER  
EDITION MAPS).

**RED:** POPULATED AREAS, MAIN ROADS AND  
BOUNDARIES  
ON OLDER MAPS.

**OTHER:** OCCASIONALLY OTHER COLORS MAY BE USED TO  
SHOW  
SPECIAL INFORMATION. THESE ARE INDICATED IN THE  
MARGINAL  
INFORMATION AS A RULE.

**SSTC**



**HILL:** AN AREA OF HIGH GROUND. FROM A HILLTOP, THE GROUND SLOPE DOWN IN ALL DIRECTIONS.



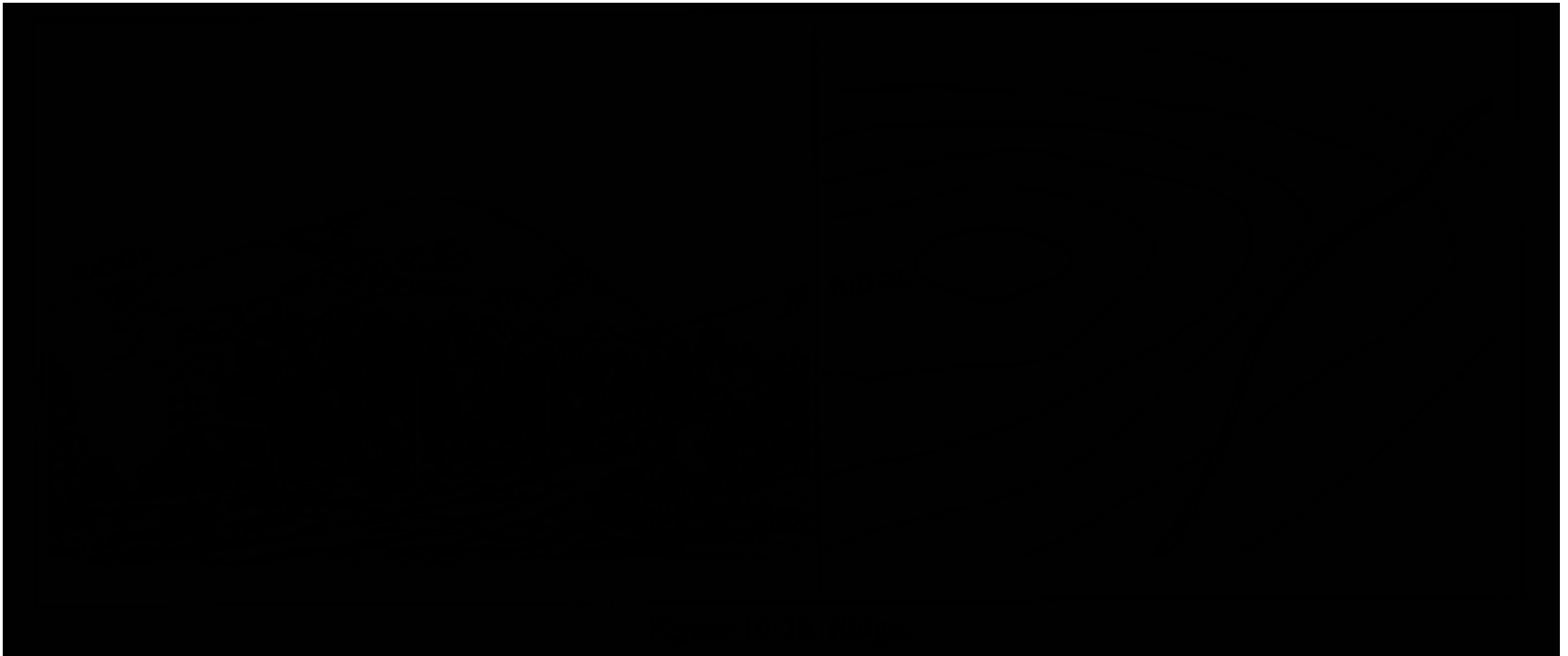
**SSTC**



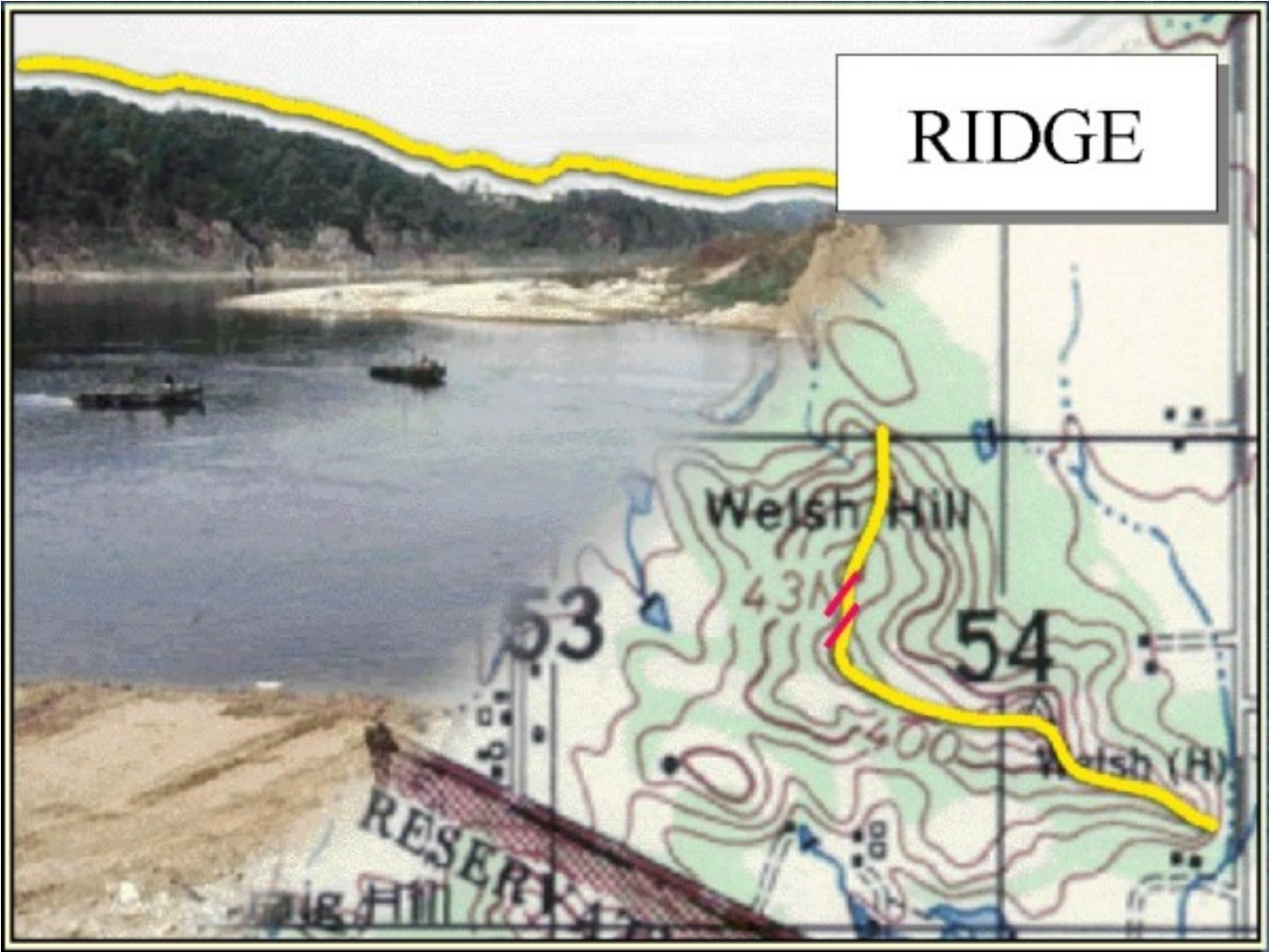
**SSTC**



**RIDGE:** A SLOPING LINE OF HIGH GROUND.



**SSTC**



RIDGE

SSTC

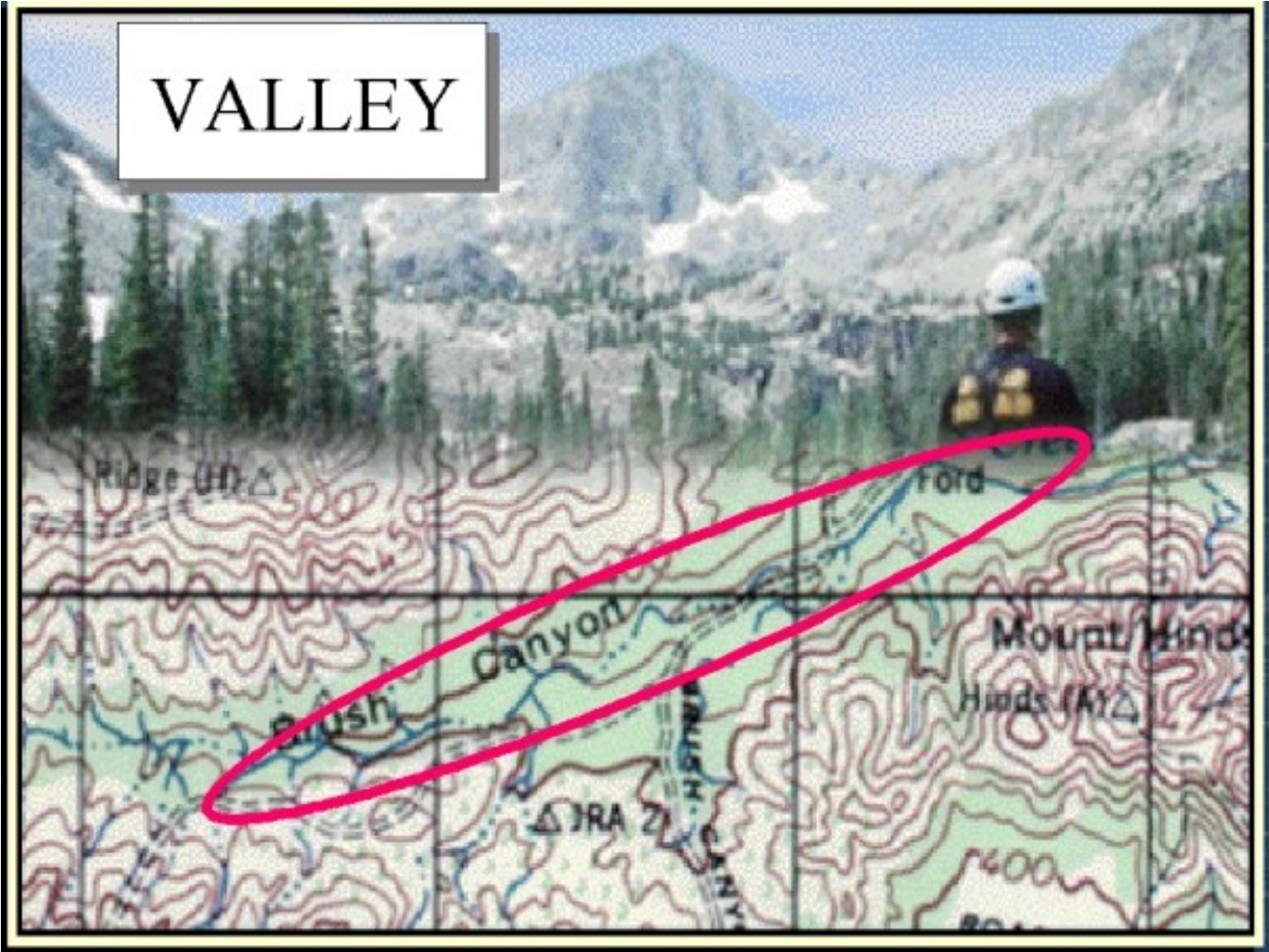


**VALLEY:** A STRETCHED-OUT GROOVE IN THE LAND, USUALLY FORMED BY STREAMS OR RIVERS.





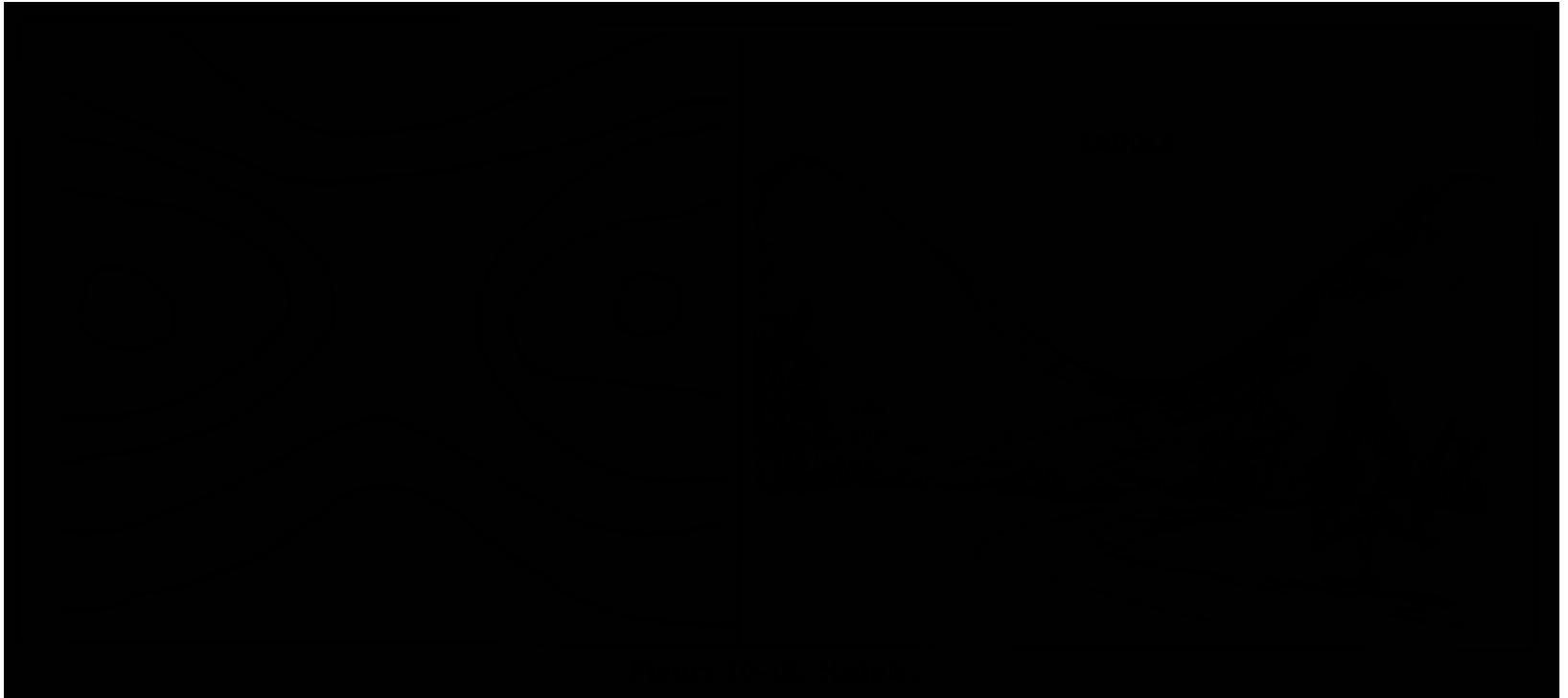
# VALLEY



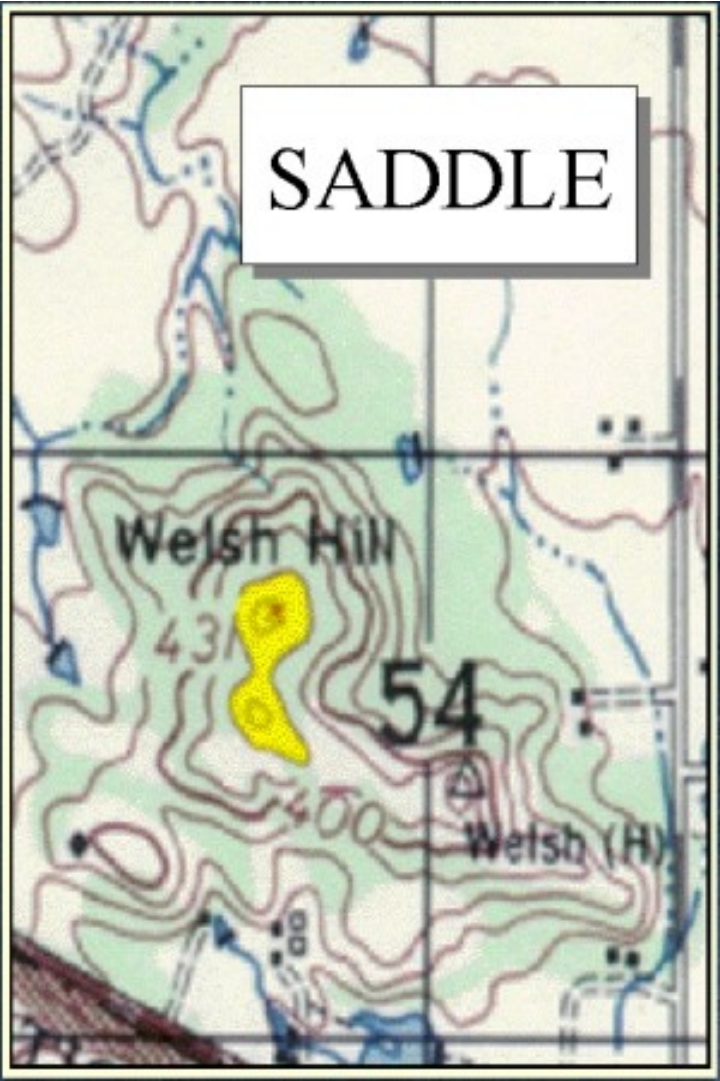
**SSTC**



**SADDLE:** A DIP OR LOW POINT BETWEEN TWO AREAS OF HIGHER GROUND.



**SSTC**



**SSTC**



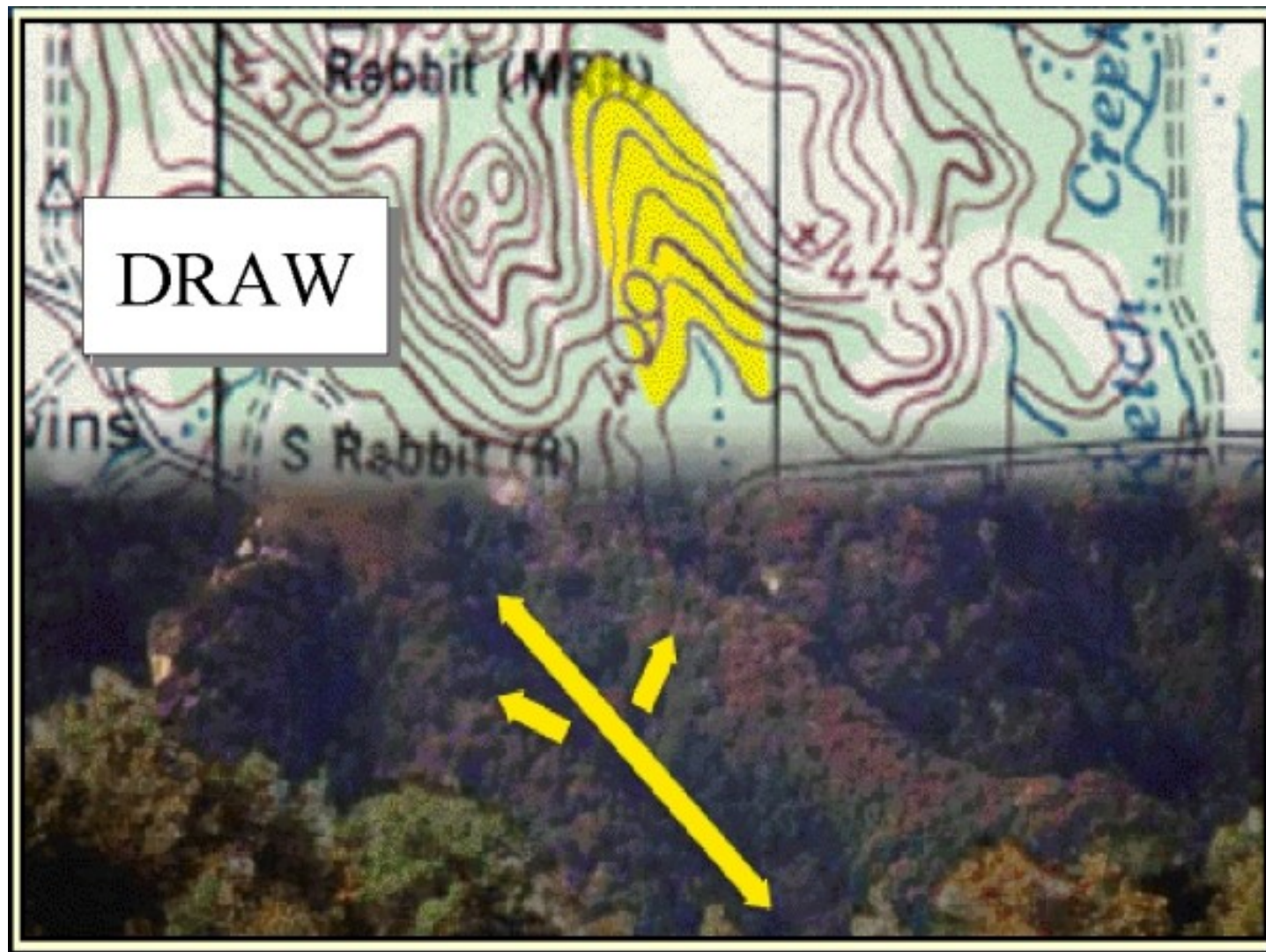
**DEPRESSION:** A LOW POINT IN THE GROUND OR SINKHOLE. THEY ARE REPRESENTED BY CLOSE CONTOUR LINES THAT HAVE TICK MARKS POINTING TOWARD LOW GROUND.





**DRAW:** A LESS DEVELOPED STREAM COURSE THAN A VALLEY. THERE IS ESSENTIALLY NO LEVEL GROUND AND, THEREFORE, LITTLE OR NO MANEUVER ROOM WITHIN ITS CONFINES.

**SSTC**



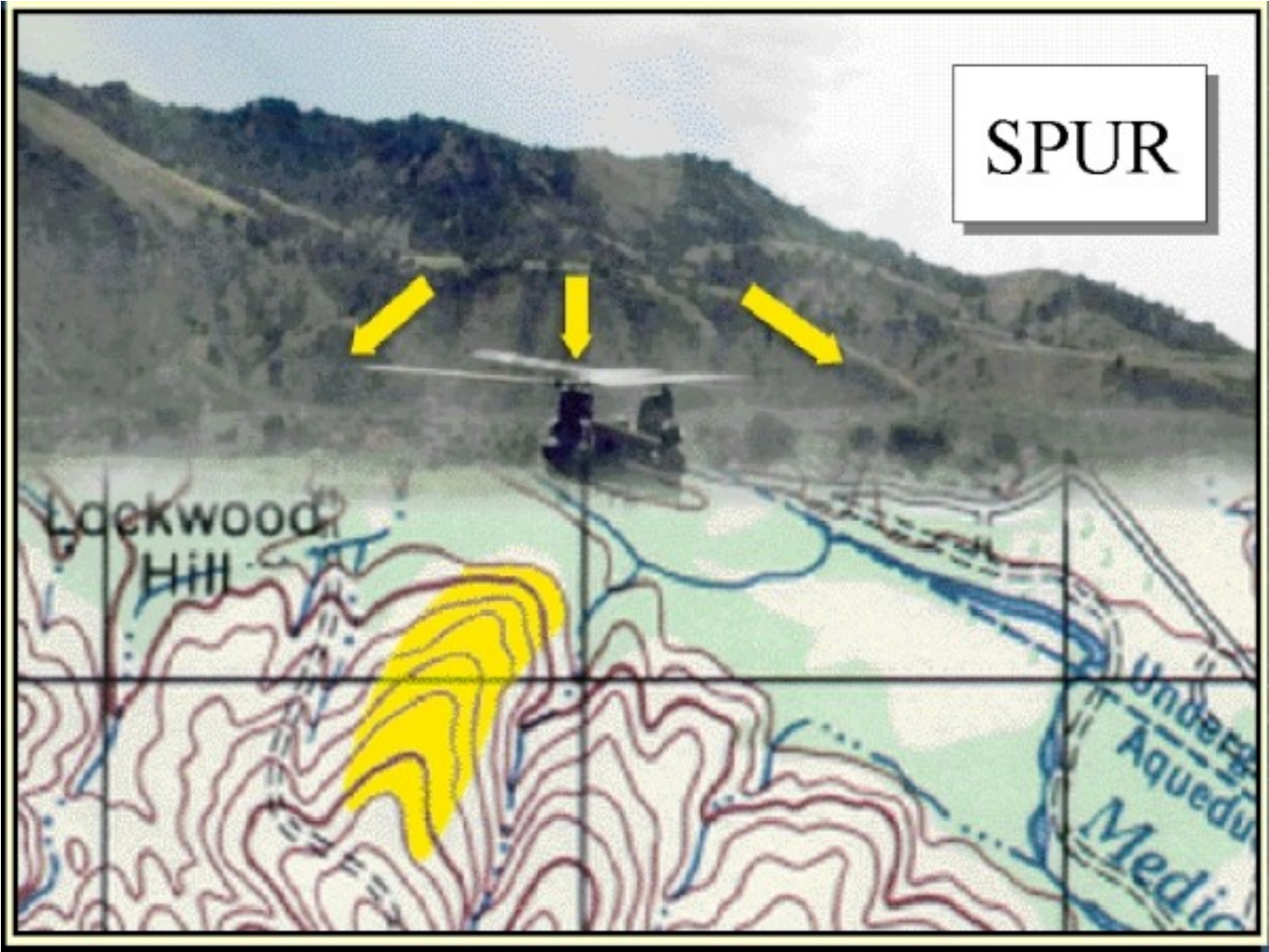
**SSTC**



**SPUR:** A SHORT, CONTINUOUS SLOPING LINE OF HIGHER GROUND, NORMALLY JUTTING OUT FROM THE SIDE OF A RIDGE.



**SSTC**



**SSTC**



**CLIFF:** A VERTICAL OR NEAR VERTICAL FEATURE; IT IS AN ABRUPT CHANGE OF THE LAND. THE SLOPE IS SO STEEP THAT THE CONTOUR LINES CONVERGE INTO ONE CONTOUR LINE OR THE LAST CONTOUR LINE HAS TICK MARKS POINTING TO LOW GROUND.



**SSTC**



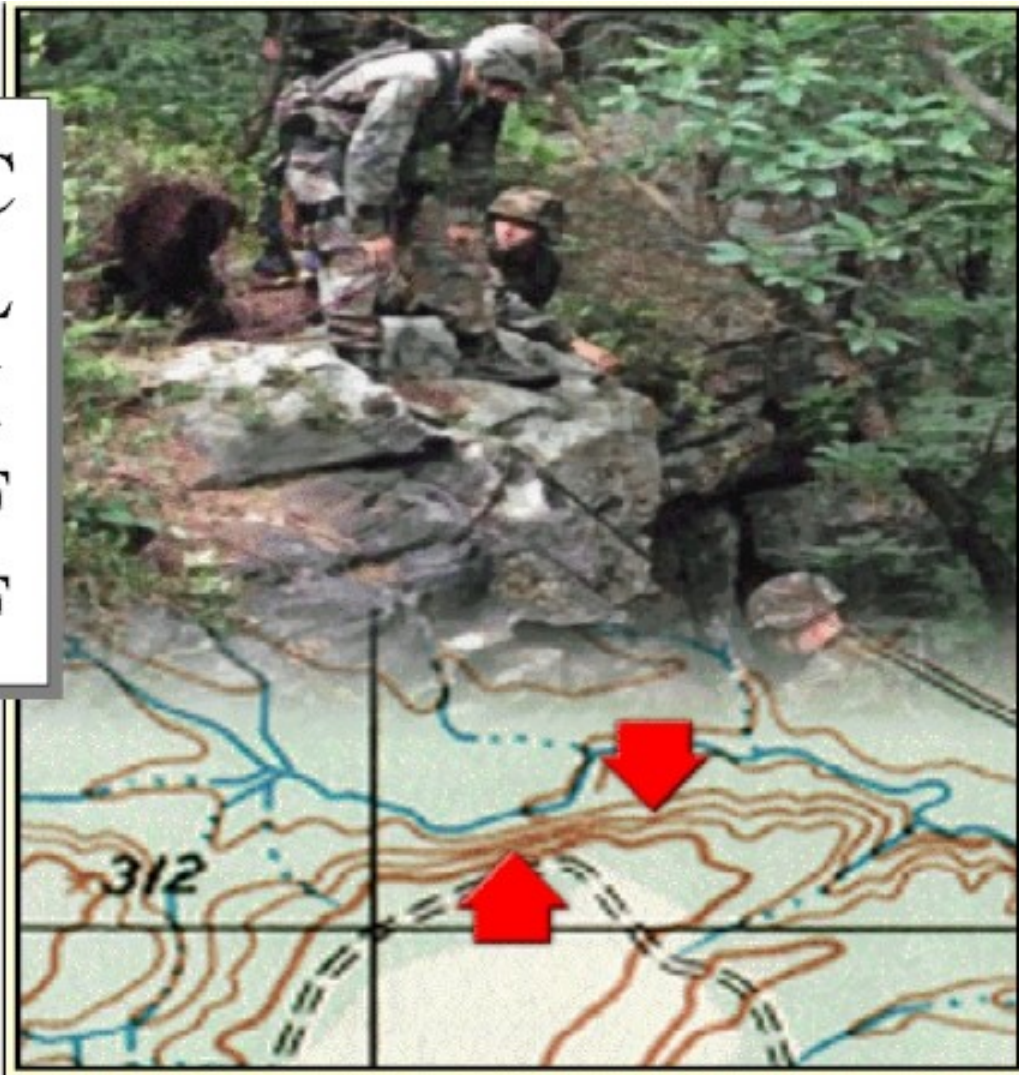
**CLIFF:** A VERTICAL OR NEAR VERTICAL FEATURE; IT IS AN ABRUPT CHANGE OF THE LAND. THE SLOPE IS SO STEEP THAT THE CONTOUR LINES CONVERGE INTO ONE CONTOUR LINE OR THE LAST CONTOUR LINE HAS TICK MARKS POINTING TO LOW GROUND.



**SSTC**



C  
L  
I  
F  
F



**SSTC**



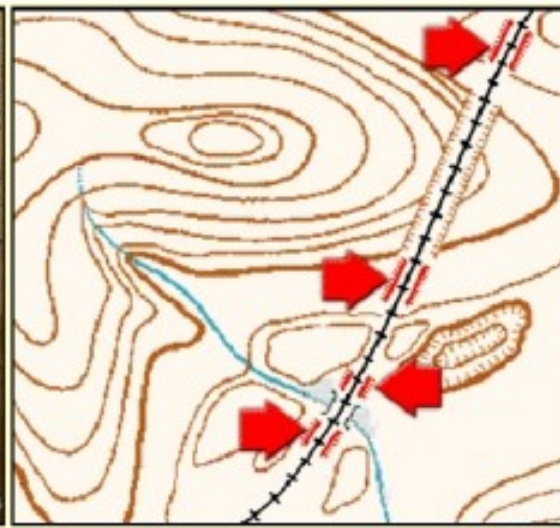
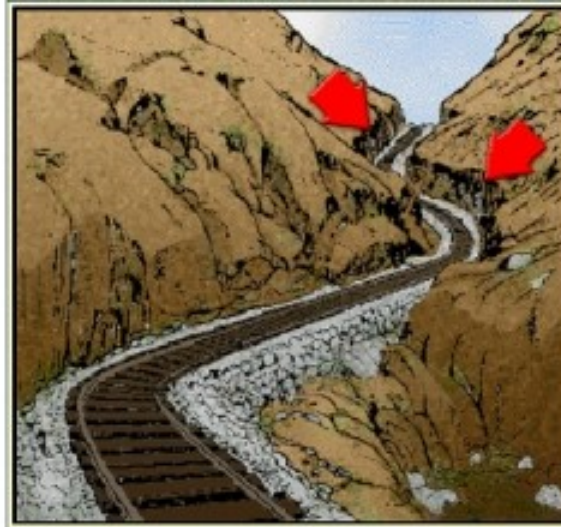
**CUT:** A MAN-MADE FEATURE RESULTING FROM CUTTING THROUGH RAISED GROUND, USUALLY TO FORM A LEVEL BED FOR A ROAD OR RAILROAD TRACK.

**FILL:** A MAN-MADE FEATURE RESULTING FROM FILLING A LOW AREA, USUALLY TO FORM A LEVEL BED FOR A ROAD OR RAILROAD TRACK.





C  
U  
T

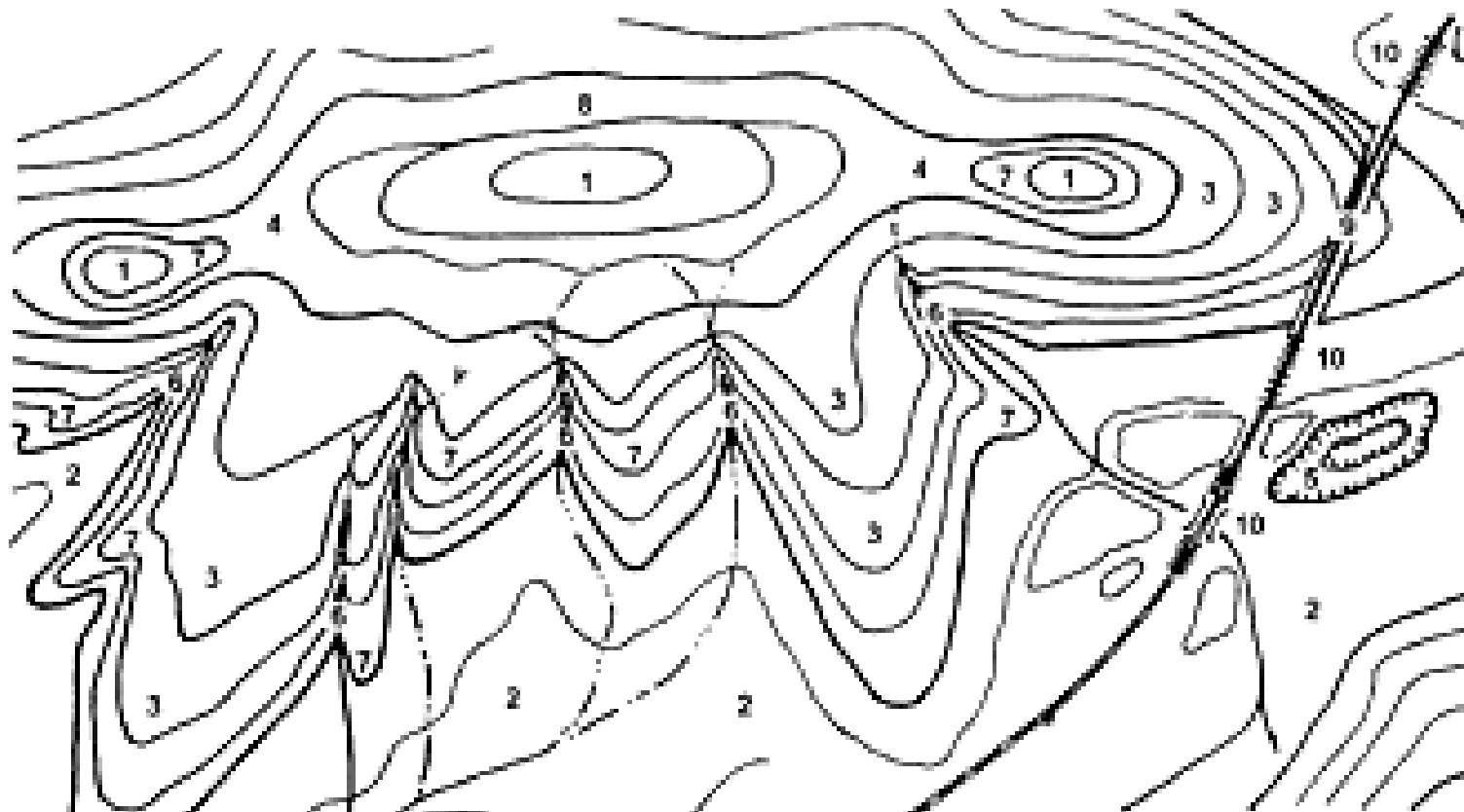


F  
I  
L  
L

**SSTC**



# Terrain Features



1.  
HILL

2. VALLEY

3. RIDGE

4.  
SADDLE

5.  
DEPRESSION

6. DRAW

7.  
SPUR

8. CLIFF

9.  
OUTFILL

**SSTC**



TAKE A BREAK



# Grid

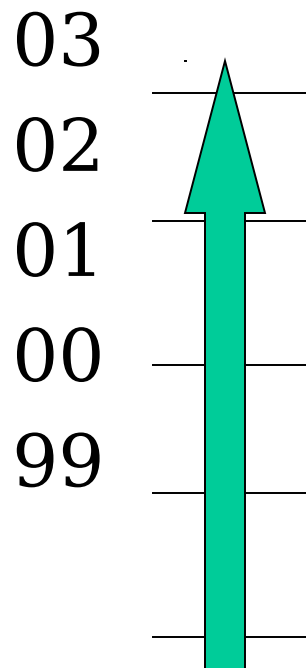
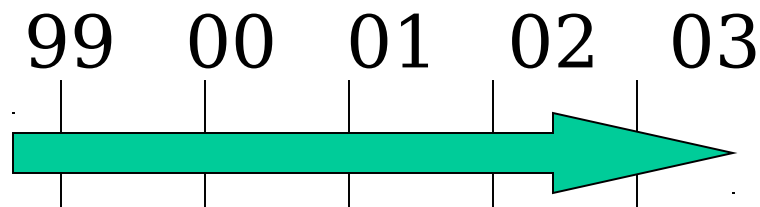
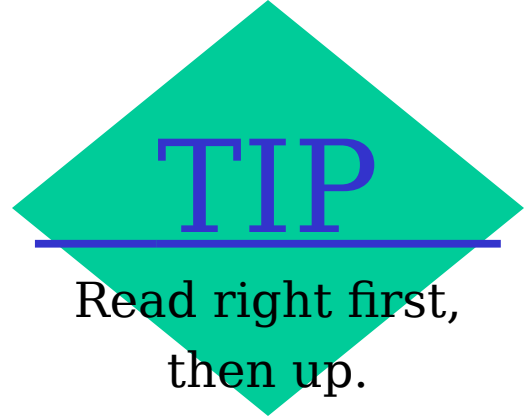
## System...

- Used to accurately locate/position objects on a map.
- Two sets of numbered parallel lines (vertical & horizontal) intersecting at right angles to form squares on a map.
- Superimposed over the map to provide a reference system.
- Grid squares are 1,000 m<sup>2</sup>.



# Grid References...

- North and South lines run up and down, numbered left to right.
- East and west lines run crosswise, numbered bottom to top.
- Read right first, then up.

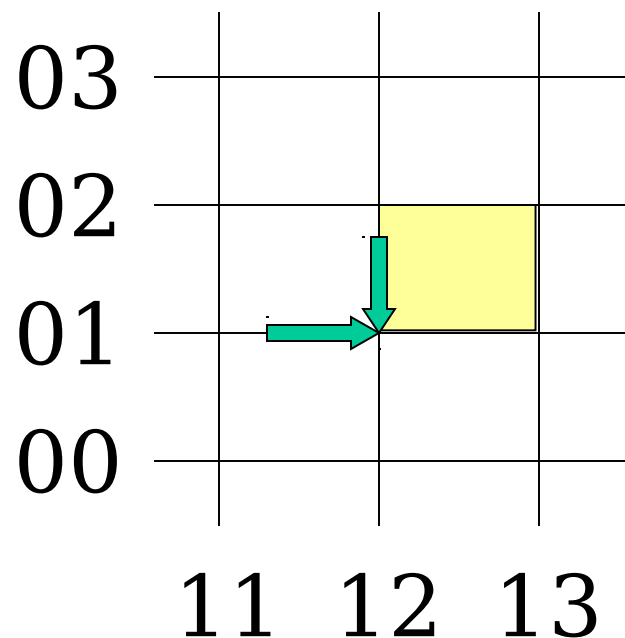


**SSTC**



# Grid Square...

- Find right 12 first.
- Then up 01.
- The coordinates represent the whole square, not just a single point.
- EH 1201 - represents 1,000 m<sup>2</sup>



**SSTC**



# Grid Square...

**Determine the identity of each of the following:**

**1. Name of the cemetery  
in grid square EG 1185**

**Forest Cemetery**

**2. Name of the church  
in grid square EG 0385**

**Church of God**

**3. Name of the lake  
in grid square EG 0895**

**Pitman Lake**

**4. Name of the airport  
in grid square EH 0701**

**Olympia Municipal Airport**

**5. Name of the school  
in grid square EH 0703**

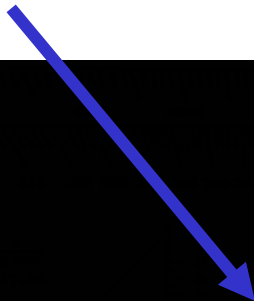
**Peter G. Schmidt**

**SSTC**



# THE MILITARY PROTRACTOR

**BASE LINE**



**DEGREES**

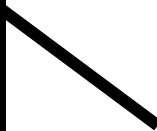


**MILS**



**THE GTA 5-2-12 IS THE MOST  
COMMONLY USED PROTRACTOR  
FOR MAP READING.**

**INDEX**

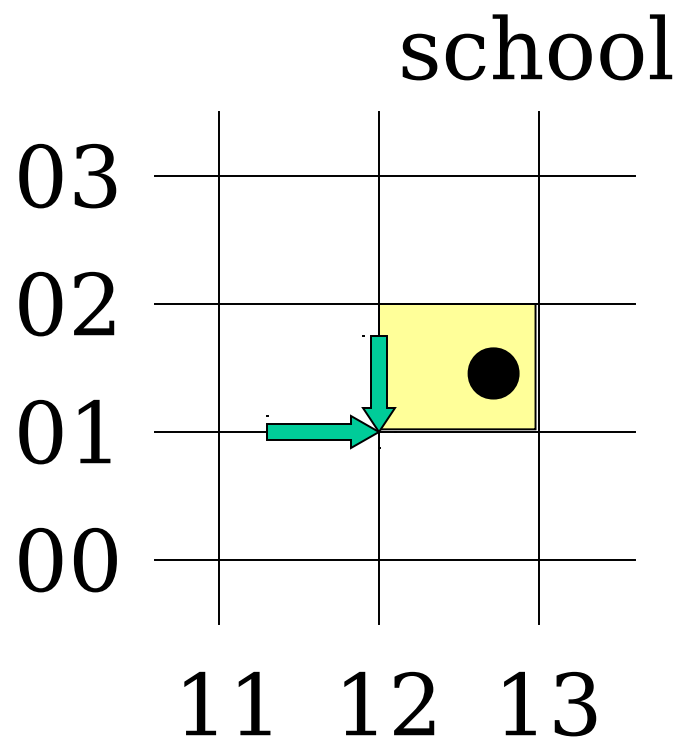


**SSTC**



# 6-Digit Coordinate

- Find right 12 first.
- Then up 01.
- Then place the horizontal portion of the protractor along the east-west grid line at the lower left-hand corner of the grid square, then slide it right until the vertical scales cut the center of the object.
- EH 12\_01\_



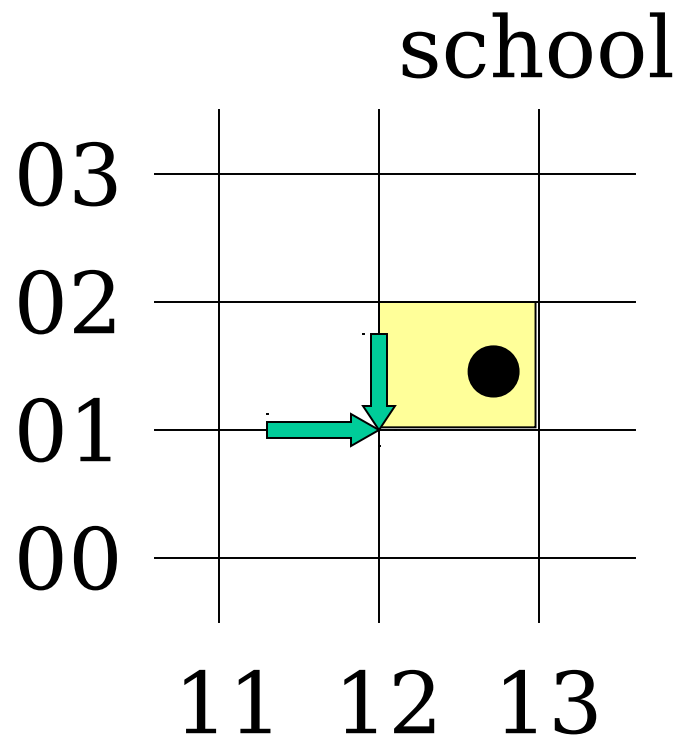
**SSTC**





# 6-Digit Coordinate

- The hundredths reading on the east-west grid line is your third digit.
- The hundredths reading on the north-south line is your sixth digit.
- EH 126 015

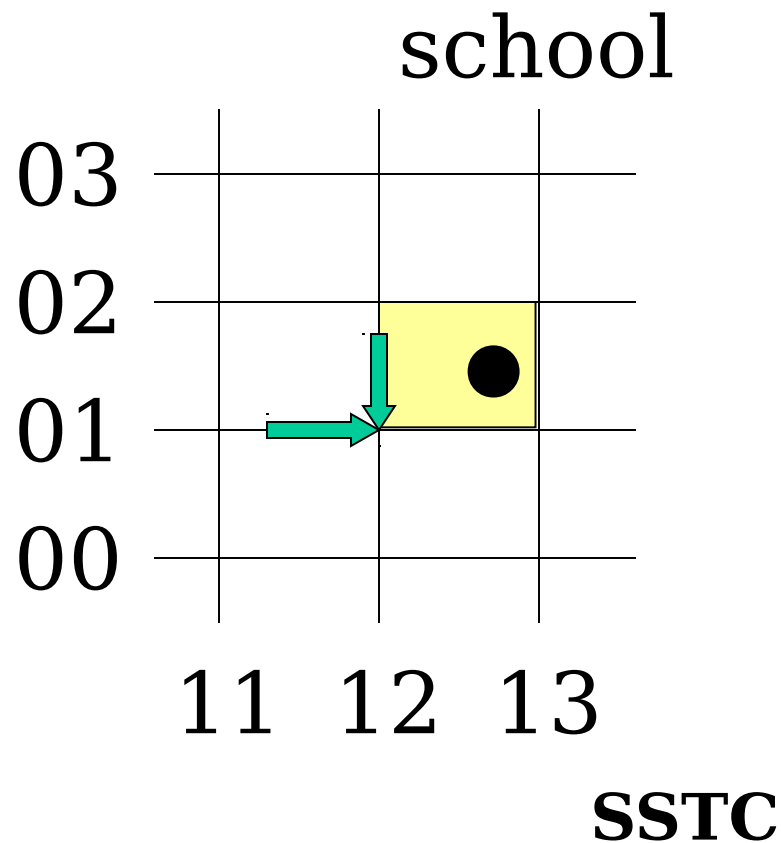


**SSTC**



# 8-Digit Coordinate

EH 1262 0150





TAKE A BREAK



# Methods of Showing Elevation

- Elevation
  - The reference or start point for vertical measurement of elevation on a standard military map are the datum plane or mean sea level, the point on the earth's surface is the vertical distance it is above or below mean sea level. Relief is the representation (as depicted by the mapmaker) of the shapes of hills, valleys, streams, or terrain features on the earth's surface.



# Contour lines

- Index
  - Starting at zero elevation or mean sea level, every fifth contour line is a heavier line. These are known as index contour lines. Normally, each index contour line is numbered at some point. This number is the elevation of that line.



# Contour lines

- Intermediate
  - The contour lines falling between the index contour lines are called intermediate contour lines. The lines are finer and do not have their elevations given. There are normally four intermediate contour lines between index contour lines.



# Contour lines

- Supplementary
  - These contour lines resemble dashes they show changes in elevation of at least one-half the contour interval. These lines are normally found where there is very little change in elevation, such as on fairly level terrain.



# Contour Lines

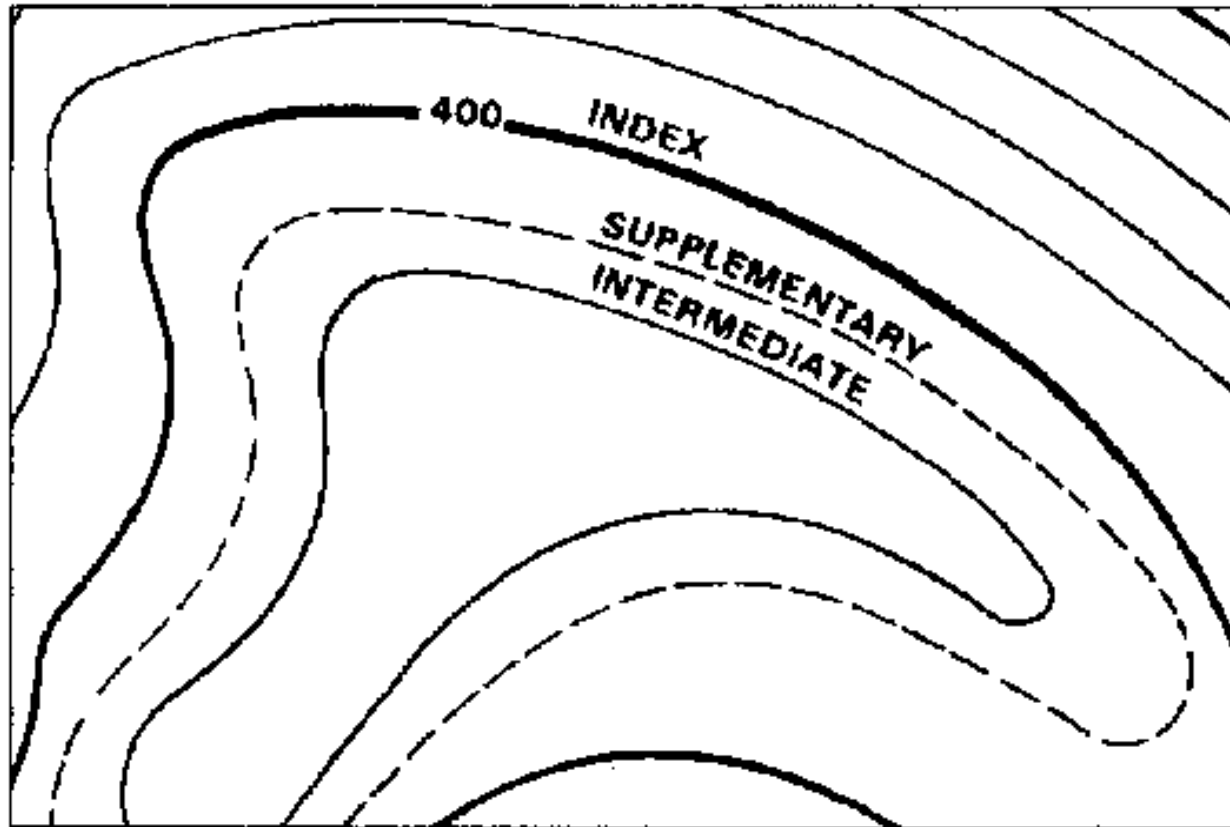


**Figure 10-1. Contour lines.**



# Contour Intervals

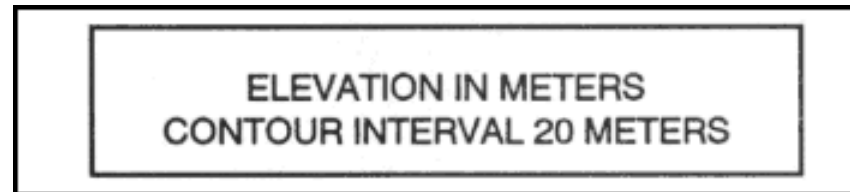
Before the elevation of any point on the map can be determined, the user must know the contour interval for the map he or she is using. The contour interval measurement given in the marginal information is the vertical distance between adjacent contour lines. To determine the elevation of a point on the map--

**SSTC**



# Contour Intervals

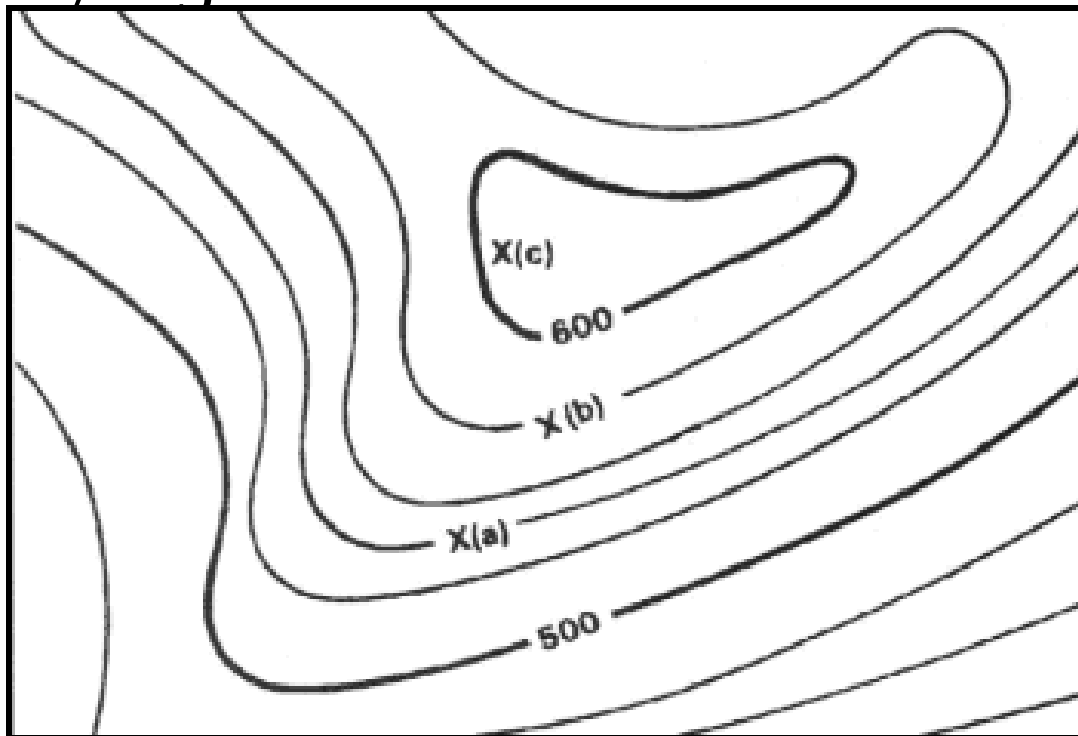
- a. Determine the contour interval and the unit of measure used, for example, feet, meters, or yards.





# Contour Intervals

- b. Find the numbered index contour line nearest the point of which you are trying to determine the elevation.



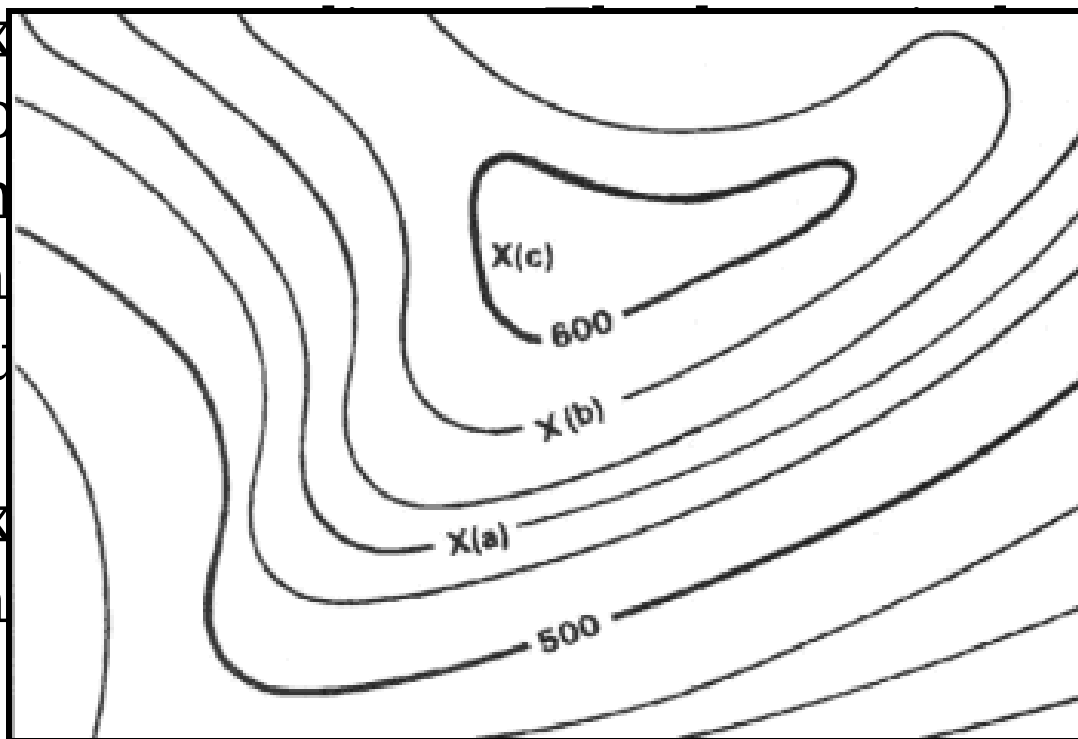
**SSTC**



# Contour Intervals

- c. Determine if you are going from lower elevation to higher, or vice versa. In Figure 10-3, point (a) is between the

index  
contour  
mean  
elevation  
The  
600.  
index  
elevation



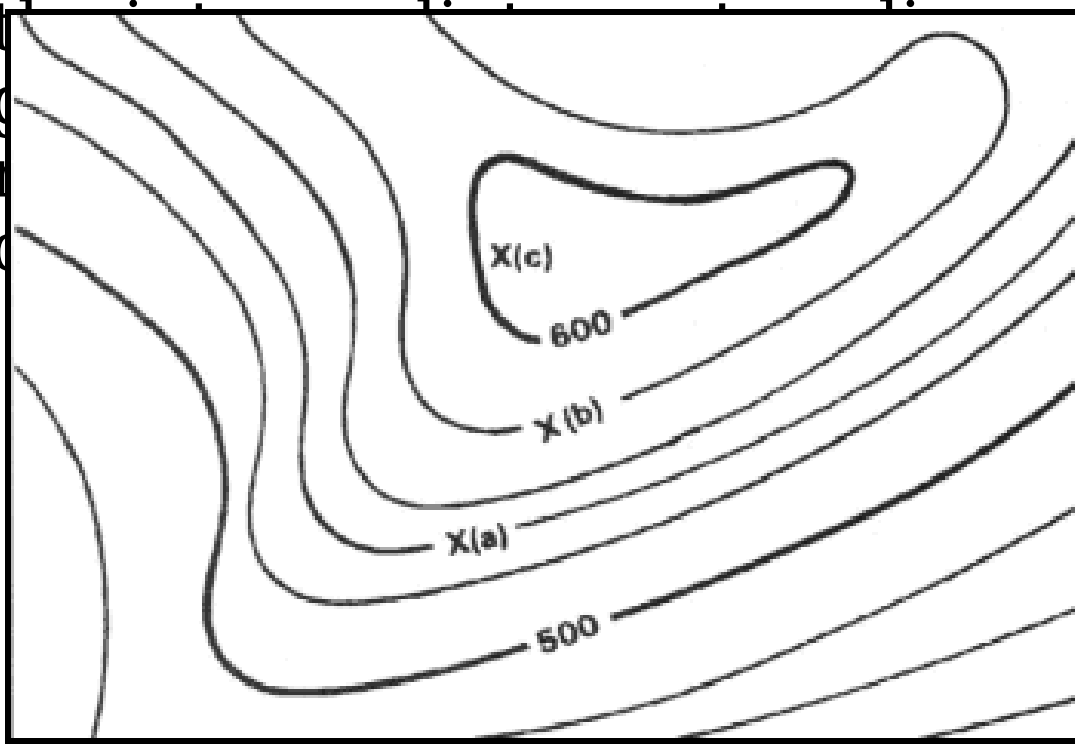
level.  
elevation  
per  
in

**SSTC**



# Contour Intervals

- d. Determine the exact elevation of point (a), start at the index contour line numbered 500 and count the number of intermediate contour lines to point (a). Locate point (a) on the second intermediate contour line above the 500-meter index contour line. The contour interval is 20 meters, thus each one of the intermediate contour lines represents an elevation of 20 meters above the 500-meter index contour line. Point (a) is located on the second intermediate contour line above the 500-meter index contour line, thus its elevation is 540 meters.



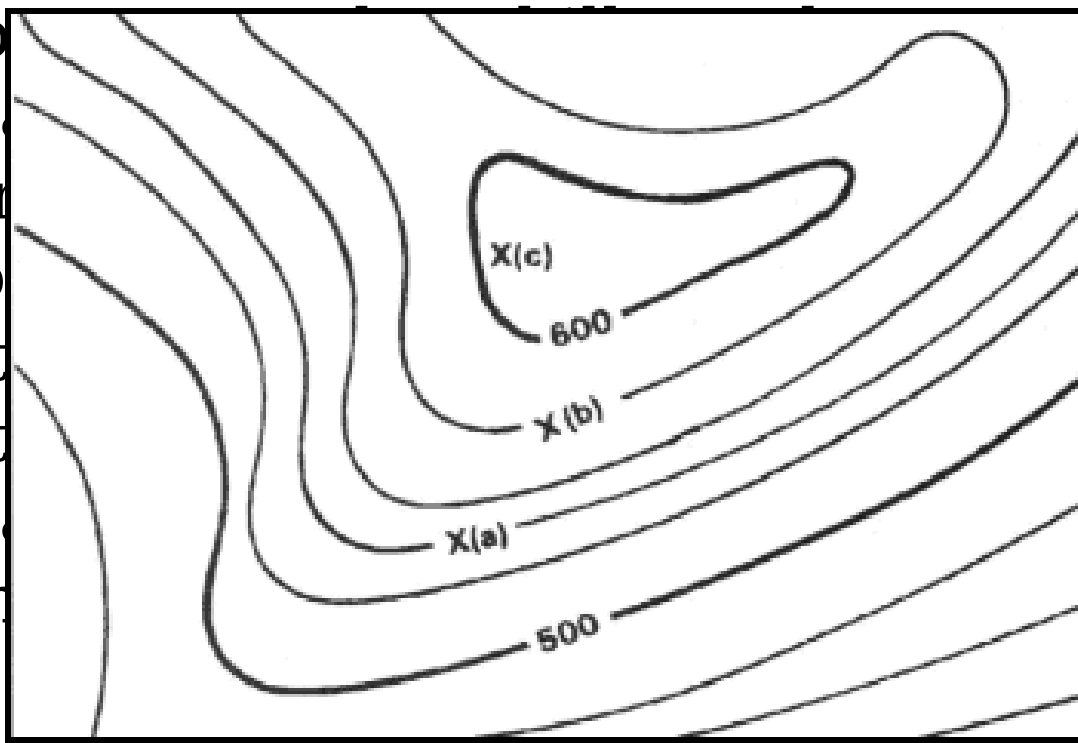
**SSTC**



# Contour Intervals

- e. Determine the elevation of point (b). Go to the nearest index contour line. In this case, it is the upper index contour line numbered 600. Locate point (b) on the intermediate contour line immediately below the 600-meter index contour line.

Below  
elev  
at an  
if yo  
cont  
cont  
elev  
from



ated  
mber,  
the  
x

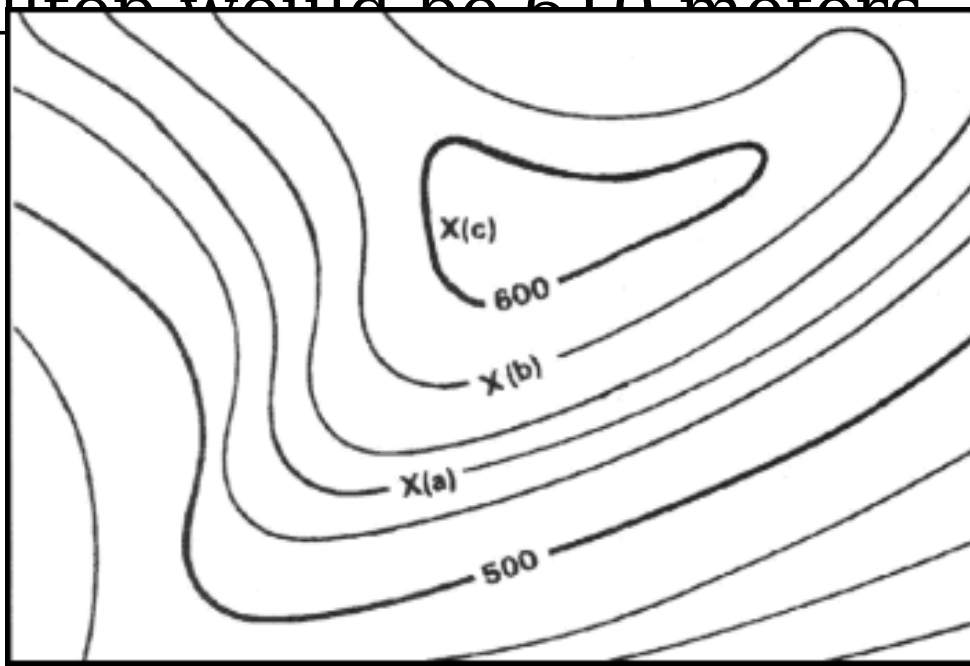
val

**SSTC**



# Contour Intervals

- f. Determine the elevation to a hilltop point (c). Add one-half the contour interval to the elevation of the last contour line. In this example, the last contour line before the hilltop is an index contour line numbered 600. Add one-half the contour interval, 10 meters, to the index contour line. The elevation of the hilltop would be 610 meters.

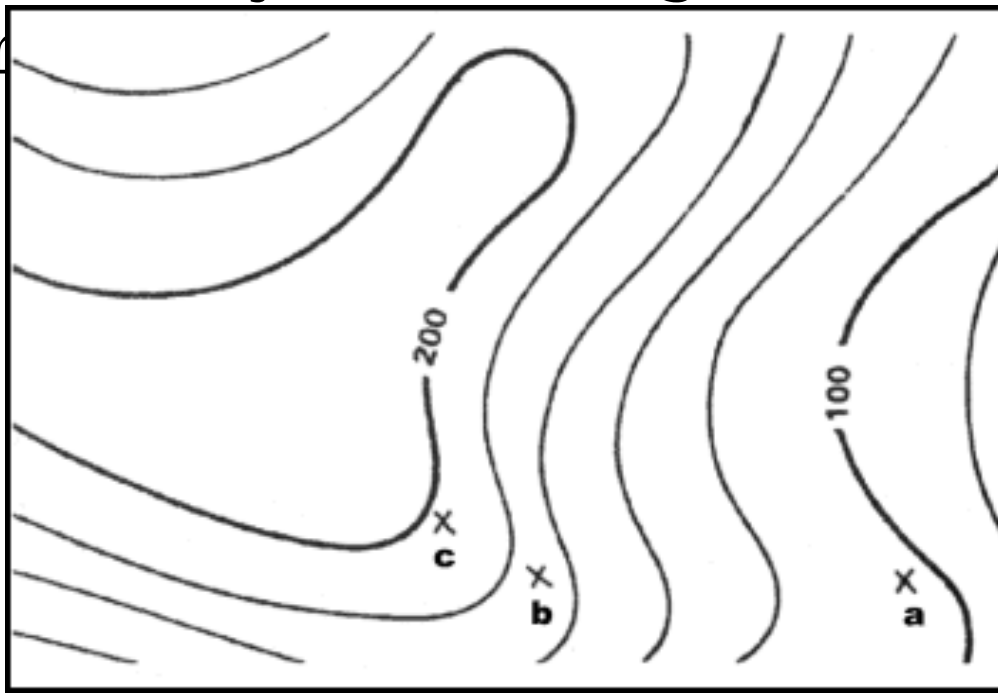


**SSTC**



# Contour Intervals

- g. There may be times when you need to determine the elevation of points to a greater accuracy. To do this, you must determine how far between the two contour lines the point lies. However, most military needs are satisfied by estimating the elevation of points.

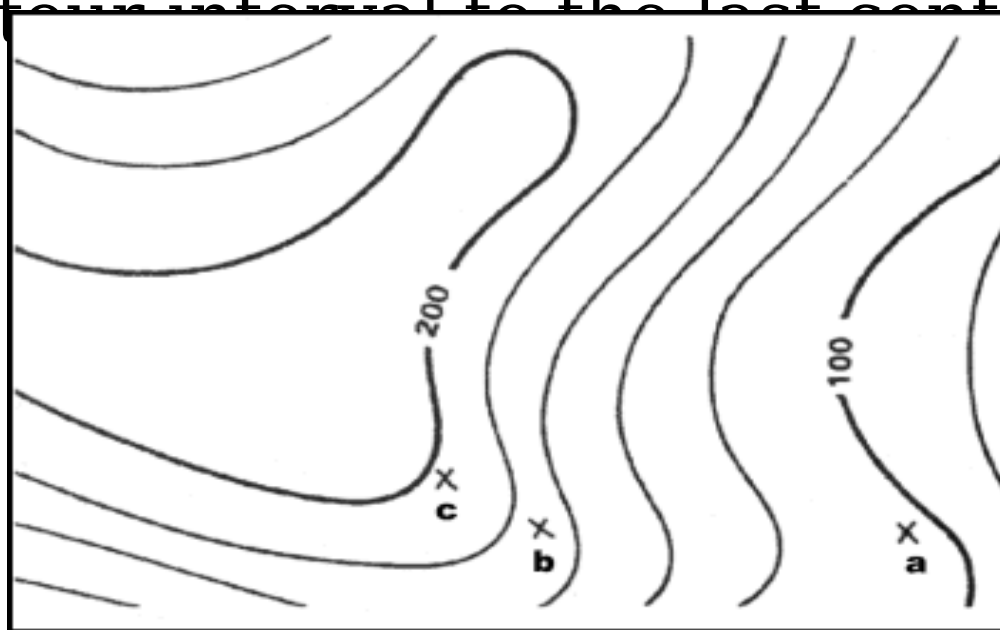


**SSTC**



# Contour Intervals

- (1) If the point is less than one-fourth the distance between contour lines, the elevation will be the same as the last contour line. The elevation of *point a* will be 100 meters. To estimate the elevation of a point between one-fourth and three-fourths of the distance between contour lines, add one-half the contour interval to the last contour line.

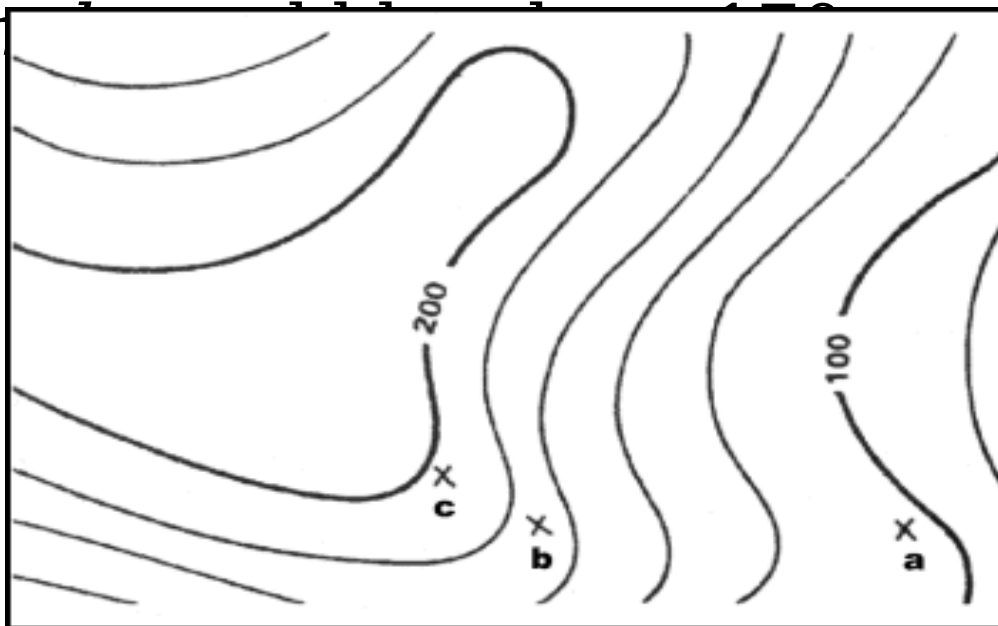


**SSTC**



# Contour Intervals

- (2) *Point b* is one-half the distance between contour lines. The contour line immediately below *point b* is at an elevation of 160 meters. The contour interval is 20 meters; thus one-half the contour interval is 10 meters. In this case, add 10 meters to the last contour line of 160 meters. The elevation of *point b* is 170 meters.

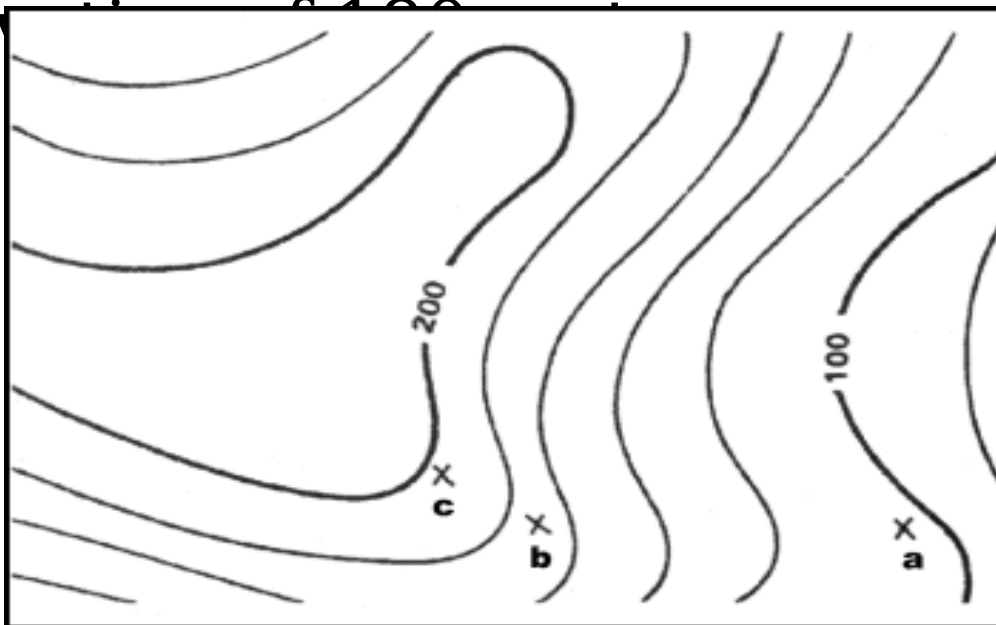


**SSTC**



# Contour Intervals

- (3) A point located more than three-fourths of the distance between contour lines is considered to be at the same elevation as the next contour line. *Point c* is located three-fourths of the distance between contour lines. *Point c* would be considered to be at an elevation of 200.



**SSTC**



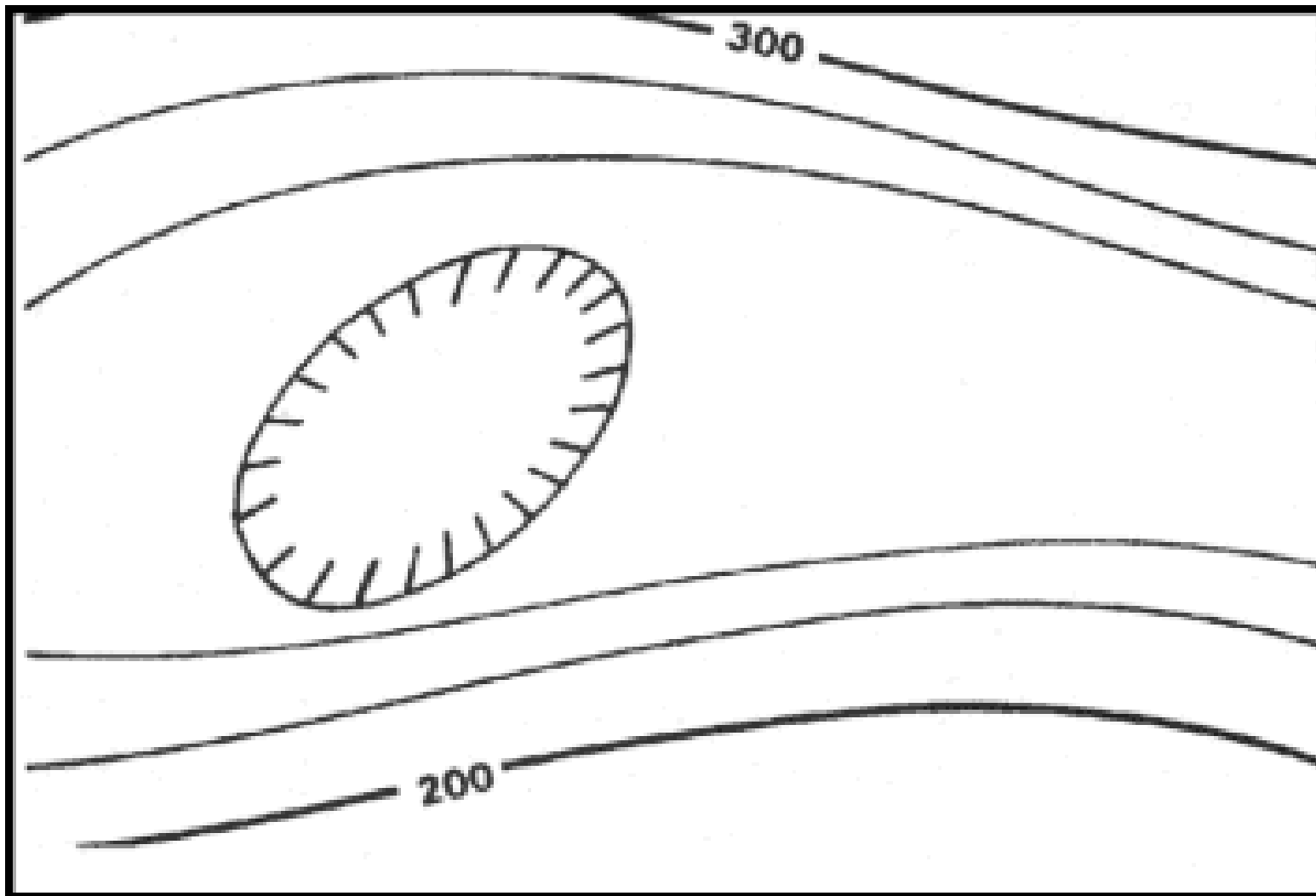
# Contour Intervals

- h. To estimate the elevation to the bottom of a depression, subtract one-half the contour interval from the value of the lowest contour line before the depression. In [Figure 10-5](#), the lowest contour line before the depression is 240 meters in elevation. Thus, the elevation at the edge of the depression is 240 meters. To determine the elevation at the bottom of the depression, subtract one-half the contour interval. The contour interval for this example is 20 meters. Subtract 10 meters from the lowest contour line immediately before the depression. The result is that the elevation at the bottom of the depression is 230 meters. The tick marks on the contour line forming a depression always point to lower elevations.

**SSTC**



# Contour Intervals



**SSTC**



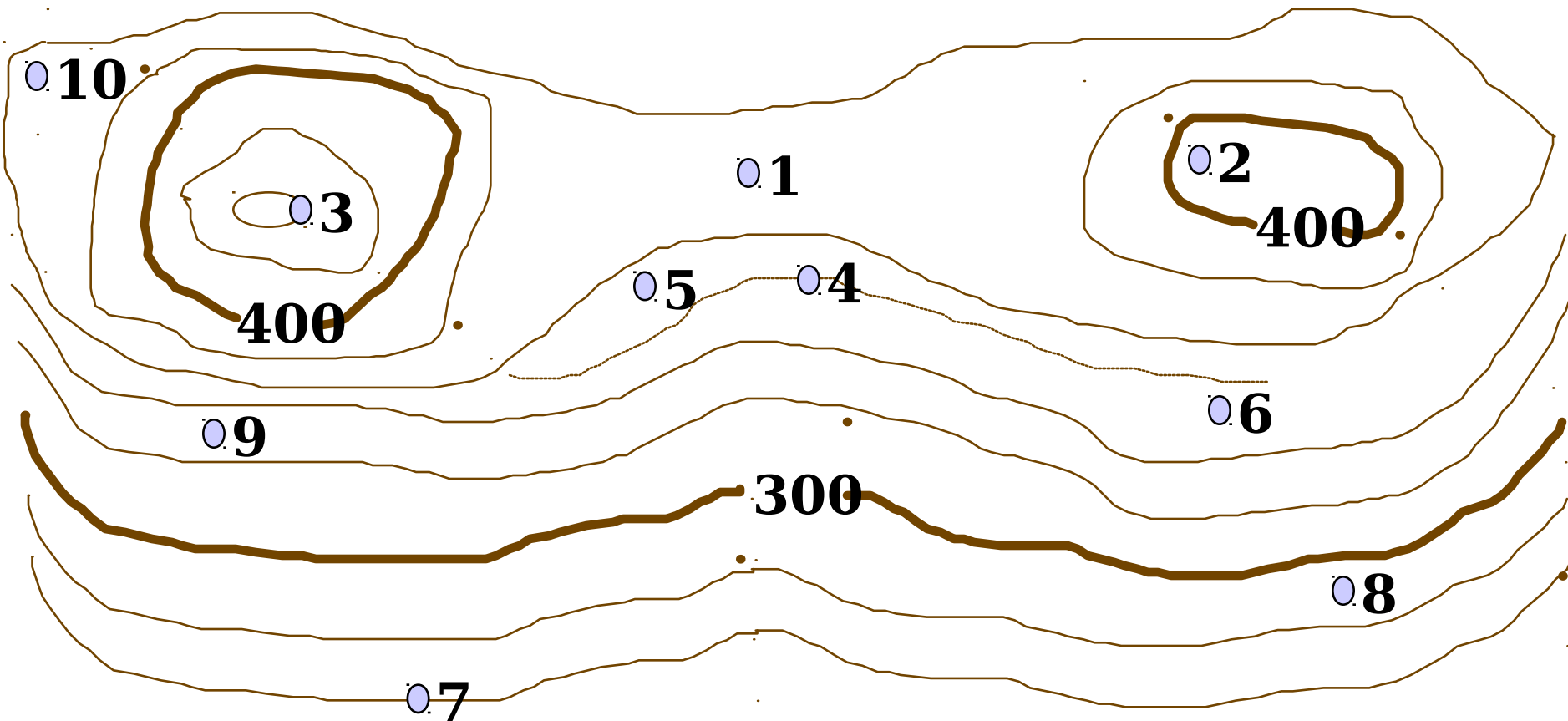
# Contour Intervals

- i. In addition to the contour lines, bench marks and spot elevations are used to indicate points of known elevations on the map.
  - (1) Bench marks, the more accurate of the two, are symbolized by a black X, such as X BM 214. The 214 indicates that the center of the X is at an elevation of 214 units of measure (feet, meters, or yards) above mean sea level. To determine the units of measure, refer to the contour interval in the marginal information.
  - (2) Spot elevations are shown by a brown X and are usually located at road junctions and on hilltops and other prominent terrain features. If the elevation is shown in black numerals, it has been checked for accuracy; if it is in brown, it has not been checked.

**NOTE:** New maps are being printed using a dot instead of brown Xs. **SSTC**



# DETERMINING ELEVATION CONTOUR INTERVAL IS 20M

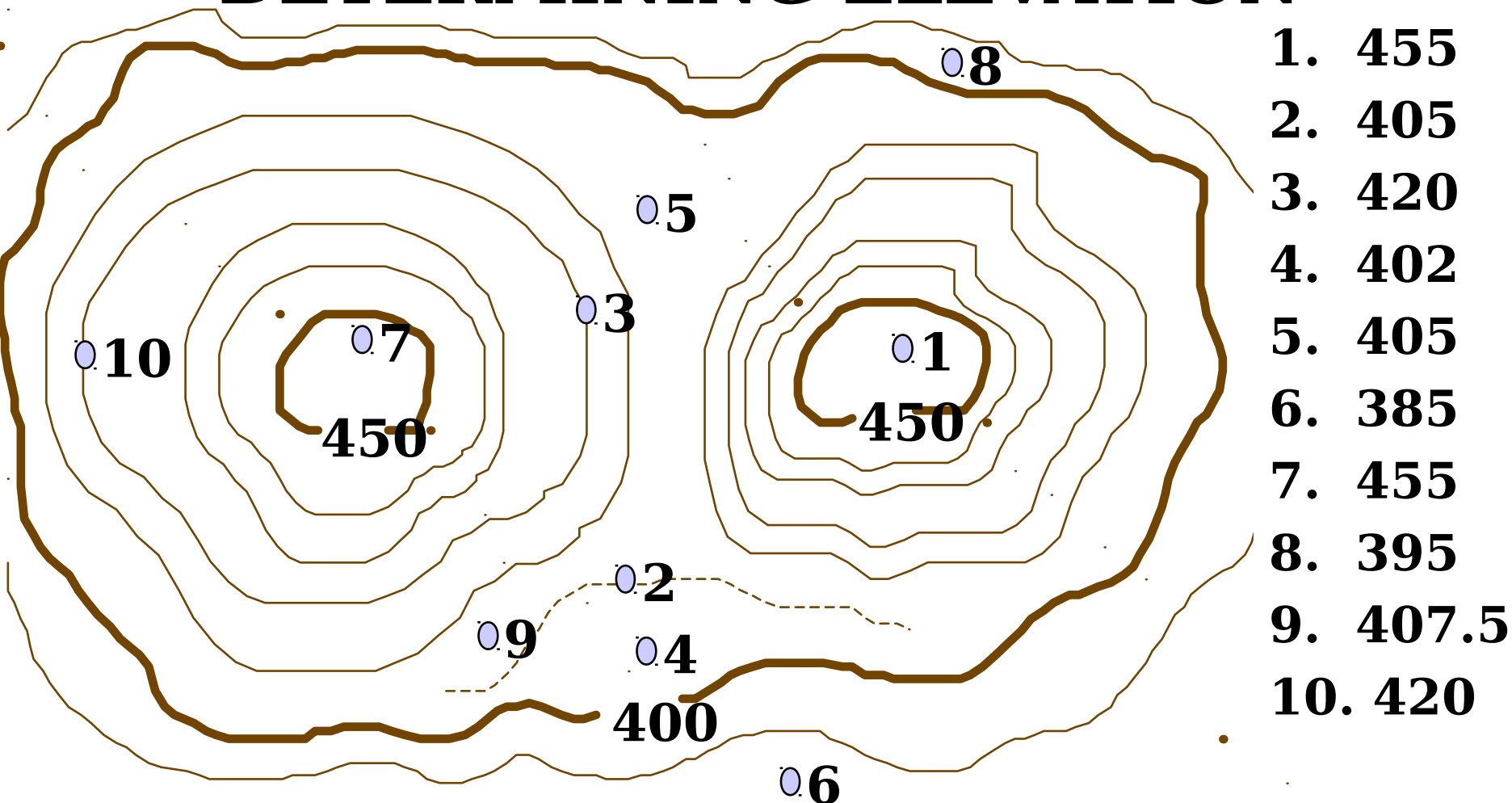


1. 370 2. 410 3. 440 4. 350 5. 355 6. 345 7. 260  
8. 290 9. 330 10. 370

SSTC



# DETERMINING ELEVATION



CONTOUR INTERVAL IS 10 METERS  
SSIC

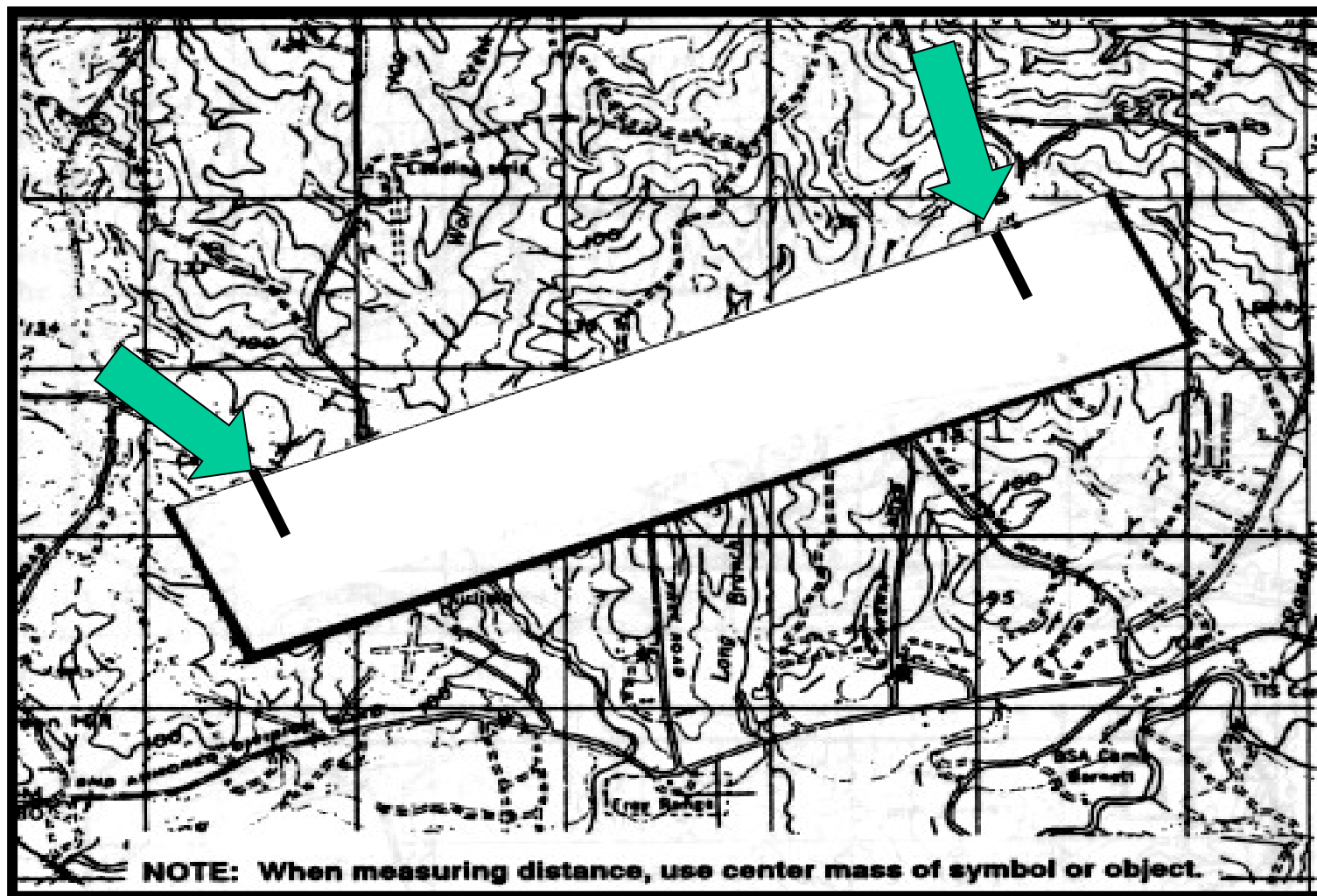


## **STRAIGHT-LINE DISTANCE**

To determine straight-line distance between two points on a map, lay a straight-edged piece of paper on the map so that the edge of the paper touches both points and extends past them. Make a tick mark on the edge of the paper at each point.



# STRAIGHT-LINE DISTANCE



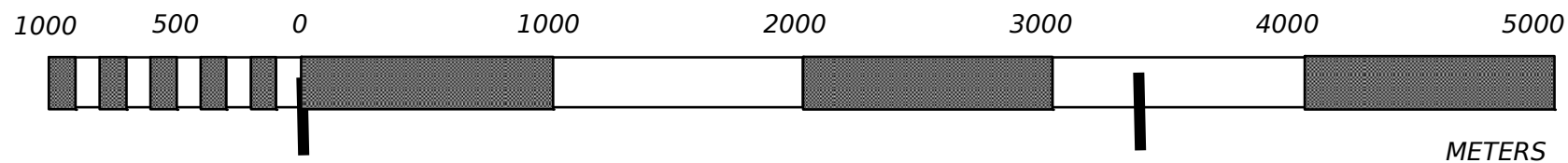
SSIC



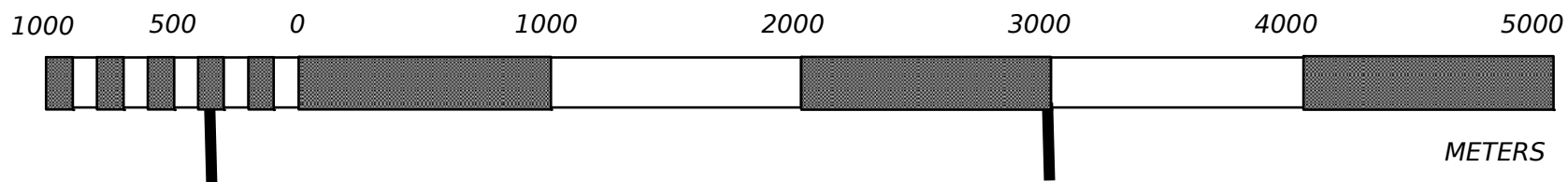
## **STRAIGHT-LINE DISTANCE**

To convert the map distance to ground distance, move the paper down to the graphic bar scale, and align the right tick mark with a printed number in the primary scale so that the left tick mark is in the extension scale

**SSTC**



**SSTC**



3350 meters

**SSTC**

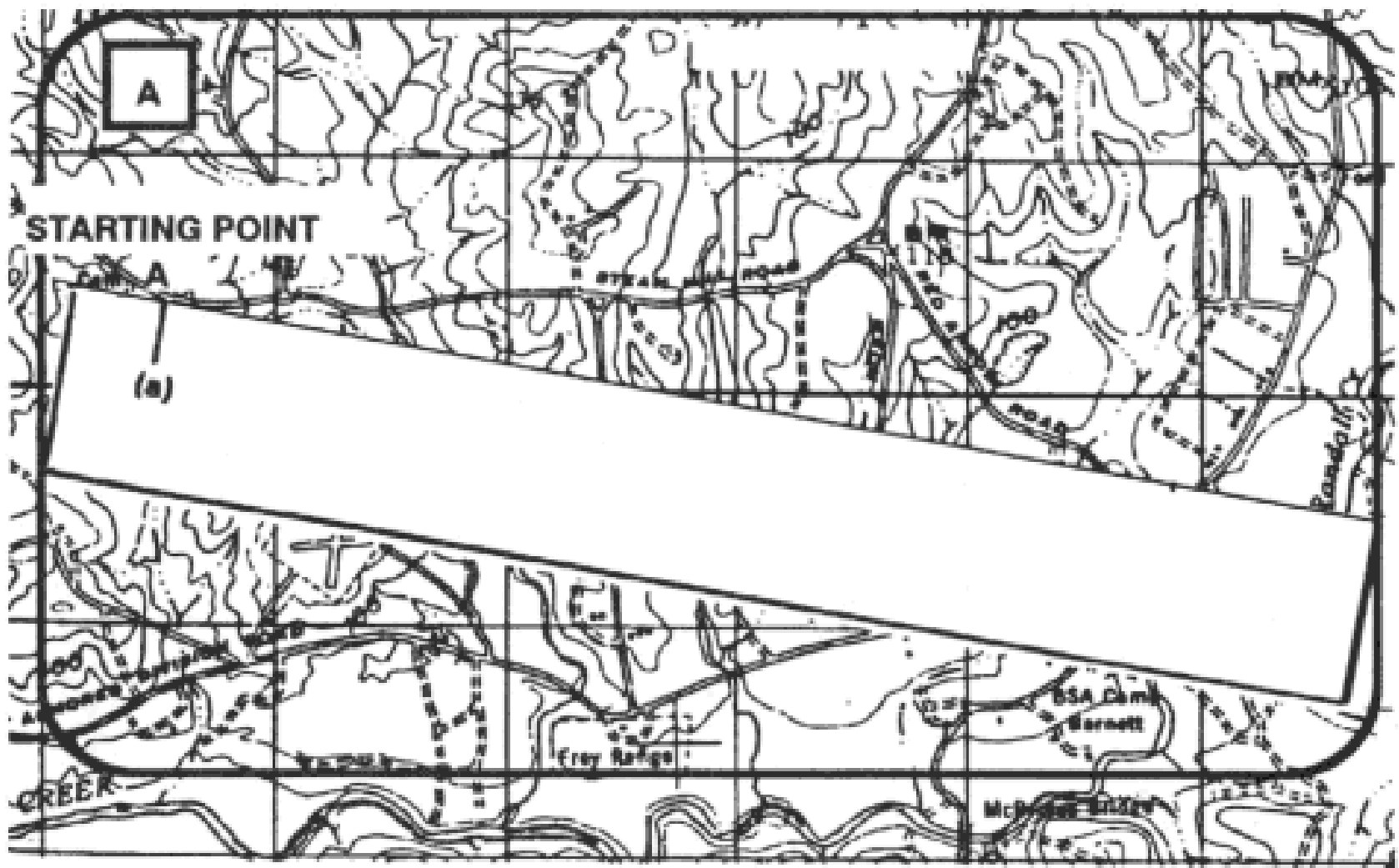


## CURVED-LINE DISTANCE

To measure distance along a road, stream, or other curved line, the straight edge of a piece of paper is used. In order to avoid confusion concerning the point to begin measuring from and the ending point, an eight-digit coordinate should be given for both the starting and ending points. Place a tick mark on the paper and map at the beginning point from which the curved line is to be measured. Align the edge of the paper along a straight portion and make a tick mark



# CURVED-LINE DISTANCE



**SSTC**



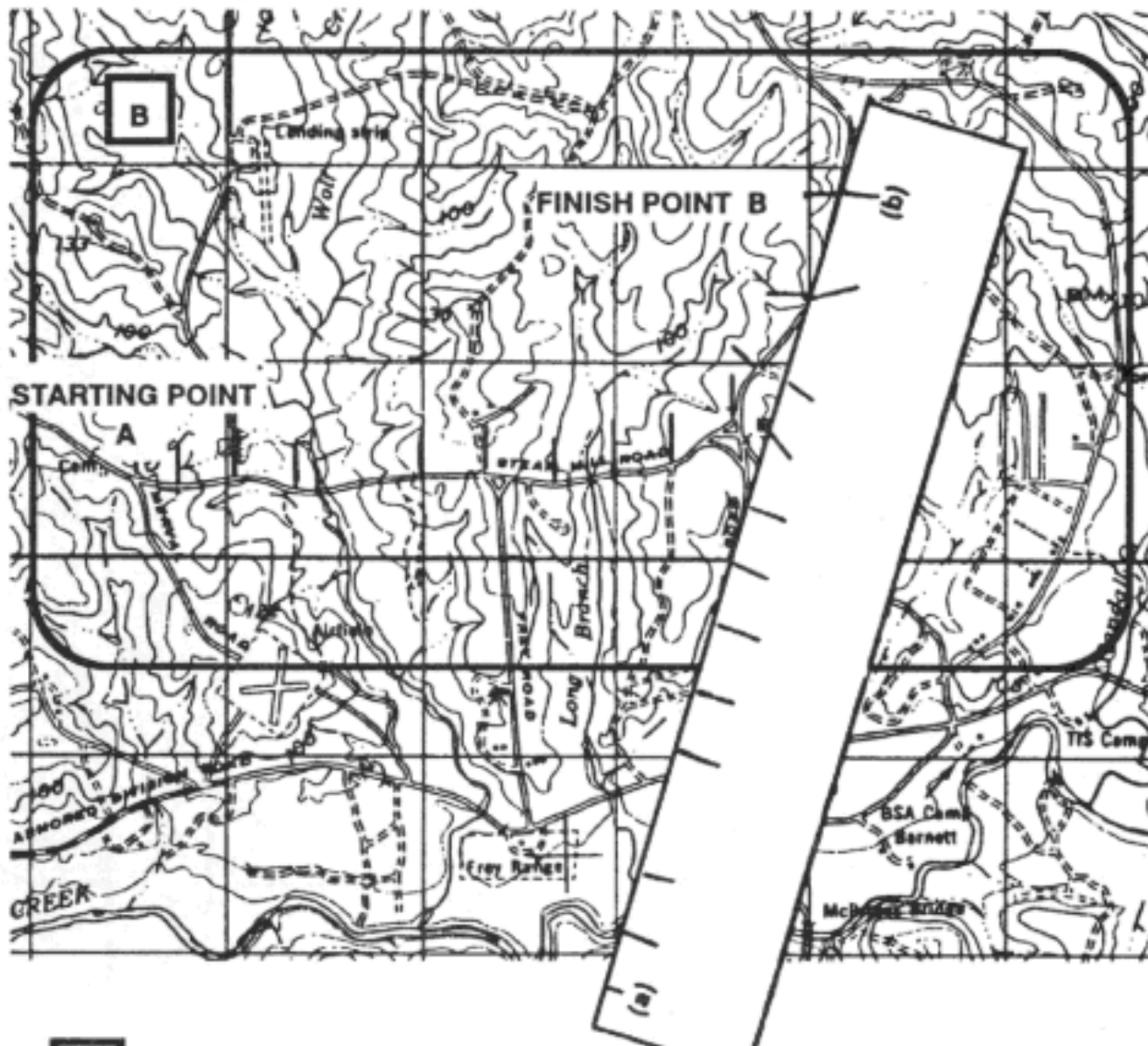
## **CURVED-LINE DISTANCE**

Keeping both tick marks together (on paper and map), place the point of the pencil close to the edge of the paper on the tick mark to hold it in place and pivot the paper until another straight portion of the curved line is aligned with the edge of the paper. Continue in this manner until the measurement is completed.

**SSTC**



# CURVED-LINE DISTANCE

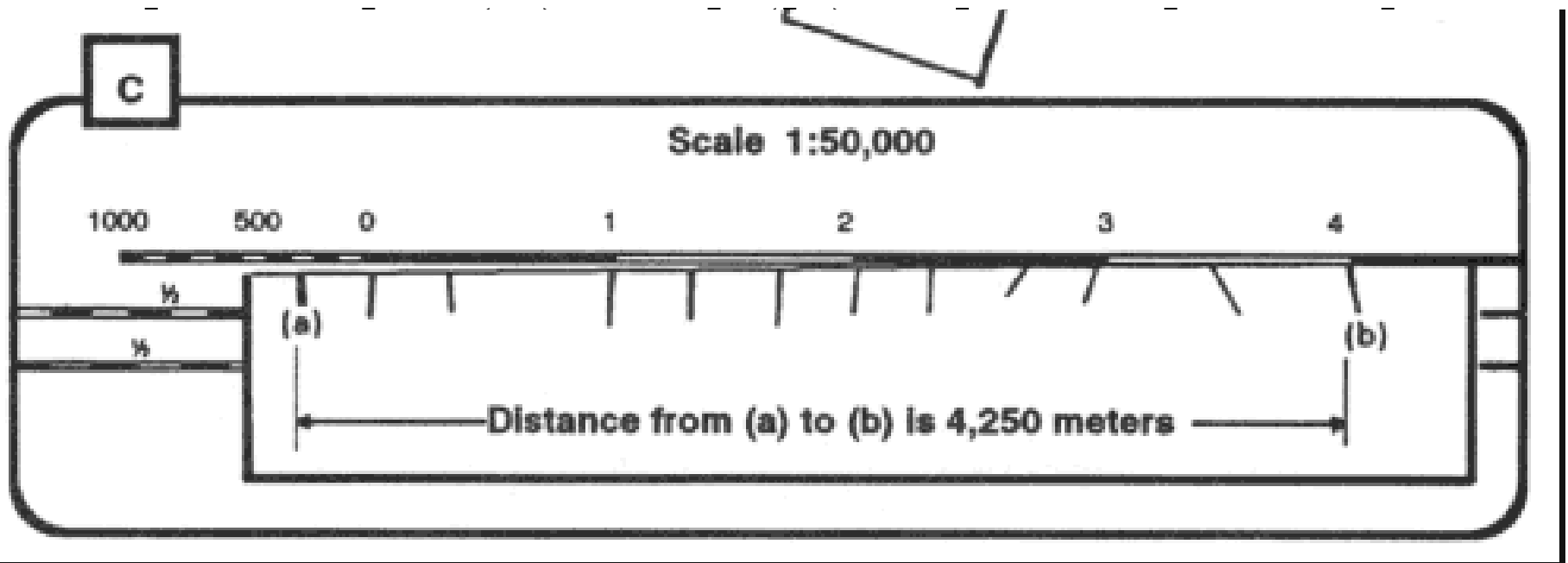


STC



## CURVED-LINE DISTANCE

When you have completed measuring the distance, move the paper to the graphic scale to determine the ground distance. The only tick marks you will be measuring the distance between are





# 3 Norths

## True

**North** is from any point on the earth's surface to the north pole. All lines of longitude are true north lines. True north is usually represented by a star.



TRUE  
NORTH

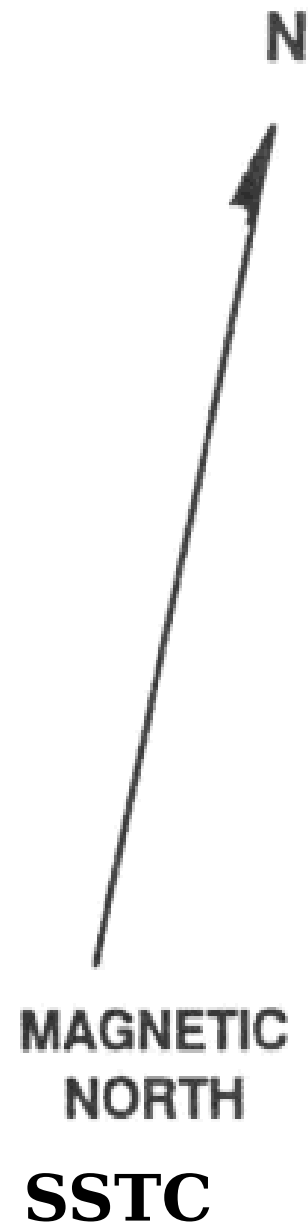
**SSTC**



# 3 Norths

## Magnetic

**North** direction to the north magnetic pole, as indicated by the north-seeking needle of a magnetic instrument. The magnetic north is usually symbolized by a line ending with half of an arrowhead. Magnetic readings are obtained with magnetic instruments, such as lensatic and M2 compasses.





# 3 Norths

## Grid

**North** north that is established by using the vertical grid lines on the map. Grid north may be symbolized by the letters GN or the letter "y".

GN

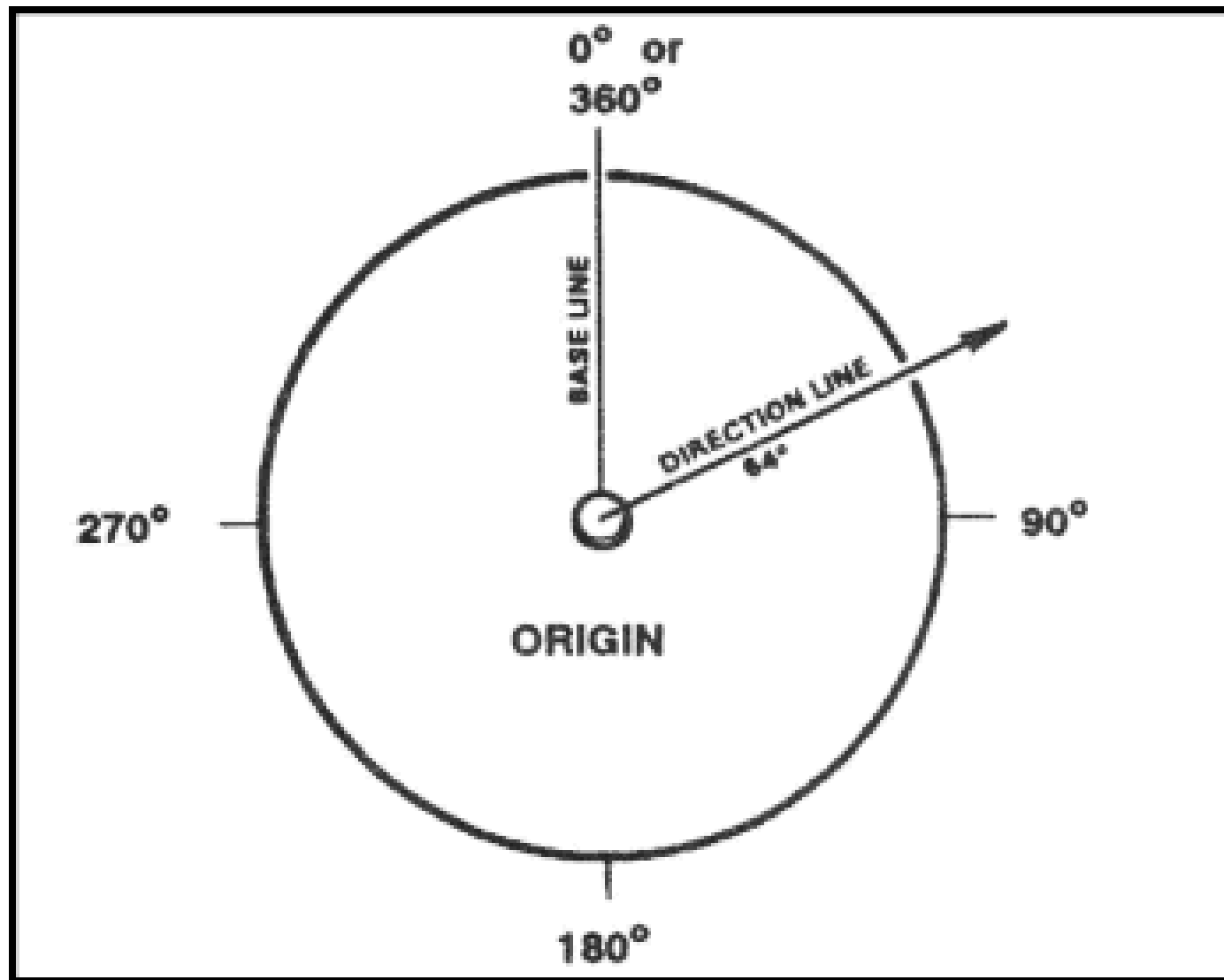
GRID  
NORTH

SSTC



# AZIMUTHS

An azimuth is defined as a horizontal angle measured clockwise from a north base line. This north base line could be true north, magnetic north, or grid north. The azimuth is the most common military method to express direction. When using an azimuth, the point from which the azimuth originates is the center of an SSTC imaginary circle. This circle is

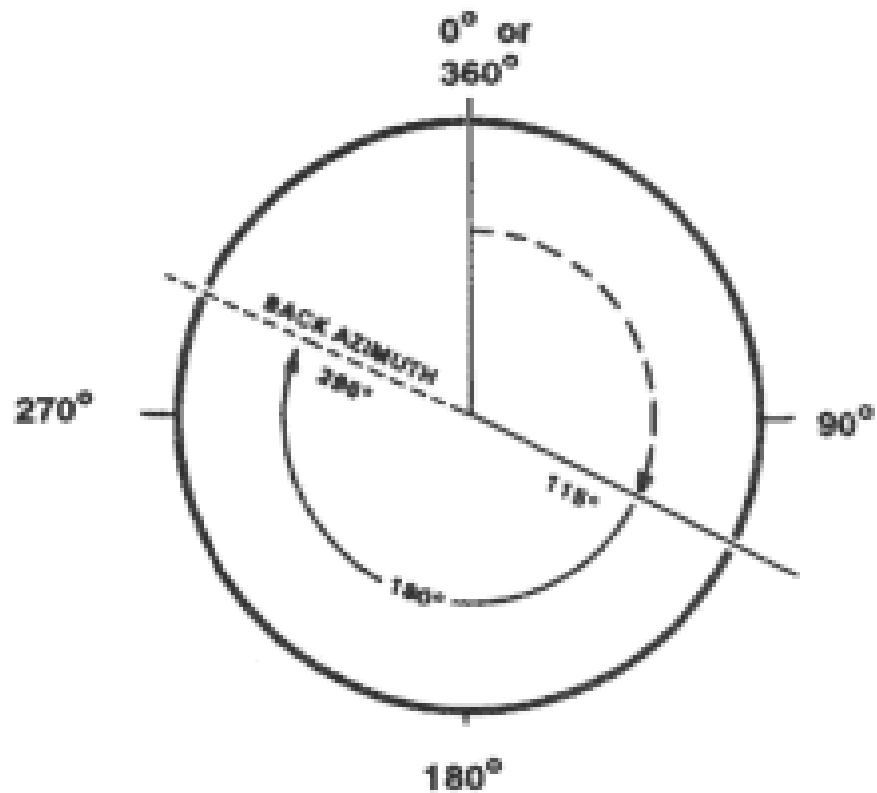


**SSTC**



## Back Azimuth

A back azimuth is the opposite direction of an azimuth. It is comparable to doing "about face." To obtain a back azimuth from an azimuth, add 180 degrees if the azimuth is 180 degrees or less, or subtract 180 degrees if the azimuth is 180 degrees or more. The back azimuth of 180 degrees may be stated as 0 degrees or 360 degrees.



EXAMPLE:

| Azimuth | $\pm$ | Back Azimuth |
|---------|-------|--------------|
| 115°    | +180° | = 295°       |
| 337°    | -180° | = 157°       |

**SSTC**



# **Magnetic Azimuth**

The magnetic azimuth is determined by using magnetic instruments, such as lensatic and M2 compasses.